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COMPRISING TEN VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY

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UNDER THE GENERAL EDITORIAL CHARGE OF

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VOLUME IX

Physiology, Pathology, Bacteriology, Anatomy

PATHOLOGY

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PREFACE.

The arrangement of this volume differs from that of the other volumes. We think that in pathology and bacteriology, the method adopted herein is fairer to the views of the authors and will be more satisfactory to the readers.

The section on Anatomy has been written by Dr. W. T. Eckley, and that on Physiology by Dr. Bernard Fantus.

In addition we have had the valuable assistance of Drs. F. Bauman, D. Bjorkman, and J. L. McGehee, Messrs. F. Fanyo and H. R. Shands, and Miss Margaret Jones.

W. A. EVANS,
ADOLPH GEHRMANN.

SECTION I.

PHYSIOLOGY.

The most important advance in physiology during the past year has been made in rendering more precise our knowledge of certain biologic reactions, the result of which promises to be of the greatest practical importance. For this reason, and because of the limited space available, this subject only is dealt with in the present review. Inasmuch as almost the whole matter is of recent development, and information regarding it is still lacking in most of the available text-books, we hope to be pardoned for deviating from the customary style of current review by referring in an introductory manner to certain facts established previous to the current year, without an understanding of which the current work in this most complex field becomes almost incomprehensible. So great has this subject become that we have had to deal with it in a most categorical manner, giving summaries and conclusions rather than the method by which they were arrived at. This will probably not be altogether undesirable, inasmuch as many most scholarly accounts of it are so encumbered with detail of experiments, discussion of conflicting views, and references that a reader who is not well initiated in the matter finishes the reading with a sense of bewilderment, acknowledging to himself that he cannot understand the subject at all. Our main object will be to give this account in a clear, straightforward, and concise manner, a thing as difficult as it is desirable.

THE ANTIBODIES.

Antitoxins.

Probably the best known and simplest variety of the antibodies are the antitoxins. For this reason it may be well to take up, first, a brief consideration of some of the fundamental facts concerning the nature of these most interesting bodies.

That living cells are capable of gradually acquiring immunity to certain poisons is one of the oldest and best known biologic facts. It has, however, remained the privilege of most recent times to define this knowledge more precisely. Production of immunity to inorganic poisons is exceptional; to organic poisons, on the other hand, quite common. The mechanism by which this immunity is obtained seems to be widely different in case of the chemically well defined poisons, as, for instance, the alkaloids, from that by which immunity is obtained against those highly complex bodies of unknown though probably proteid composition, that we designate as the toxins. In the latter case, we know it is produced by means of formation by the living cell of a specific antitoxin, a body which is capable of chemically combining with and thus rendering harmless the particular toxin under whose influence it was produced. The assumption of antitoxic sera against the chemically well defined poisons, such as inorganic substances, glucosides, or alkaloids, is erroneous (Ehrlich). Thus, in the morphin habitue, it has been determined no antimorphin is formed, but the relative immunity is due to a more rapid and complete morphin destruction in the system. Antialcohol serum is an imposition.

The class of poisons against which antitoxins are formed is large and important, and the various members exhibit a striking similarity in their physical and chemical relations as well as in their behavior toward blood and tissue cells. This class embraces not only the bacterial toxins, but also the various enzymes, certain plant albumoses, and snake

venom. That the mode of action of these two classes of poisons must differ is plain; this is evidenced, for instance, by the fact that the alkaloids and other well defined chemical bodies have a markedly transient action, which speaks for a looseness of combination, possibly after the nature of a solution in protoplasm; while the toxin is so enduring in its action that it must enter into firm chemical union with the protoplasm of the cells. The reason for this remarkable affinity of the living substance for these poisons may become plain when we remember that the toxins are in point of derivation and of chemical characteristics closely allied to the proteids, the true food stuff, the only really assimilable matter.

Upon the basis of fact, Ehrlich (Schlussbetrachtungen, Nothnagel's spec. Path. u. Therap. Bd. Viii, p. 163, 1901) builds so ingenious a theory, that most workers in this field have accepted it as a working hypothesis. We may assume, he says, that toxins as well as food stuffs possess atom groups by means of which they are enabled to unite with certain atom groups of cells. In order to facilitate discussion, we may call the receiving atom group of protoplasm "receptors," and the attaching atom group of toxin and of food the "haptophore" group. Receptor and haptophore groups have an affinity for each other, they unite and by means of this union the rest of the molecule is introduced into the complex of the cell. Thus the receptors would be the most important instrument of internal metabolism.

Absence of suitable receptors for the haptophore group of a toxin would explain the natural immunity possessed by certain species of animals against certain poisons. When a receptor has united with a haptophore group, that particular receptor, so long as the union lasts, has lost its receiving function. But the cell has continual need for receptors so that they are continually reproduced. When a particular variety of receptors is used up with special rapidity, that loss is not only compensated but over-compensated, inasmuch as it is a general tendency of the organism to overcompensate losses, as has been so ably shown by

Carl Weigert. Thus it happens that the receptors become excessive and are thrown off to the blood after the manner of a secretion. The freely circulating receptors still having their chemical affinity for a certain haptophore group unite with it and thus render it incapable of uniting with the receptors of cells. In case of toxin that would be antitoxin action. The antitoxins are nothing more nor less than free circulating receptors. Thus the wonderfully purposeful arrangement, that by introduction of a toxin a substance is formed which is capable of rendering it harmless, would be simply and naturally explained; it is nothing more than a reproduction of normal cell life. According to this theory, antibodies would not only have to be formed for toxins, but also for foods. And, indeed, this is the case as will be seen from a brief study of the precipitins.

The Precipitins.

The beginning of our knowledge of the specific precipitins formed the startling announcement of Kraus (*Wiener klin. Wochenschrift,* 1897), that on mixing filtered typhoid cultures with serum from a typhoid patient, the mixture became cloudy and after awhile filled with fine flocculi, which gradually subsided leaving a supernatant clear liquid. A similar reaction he obtained with filtered cholera and plague cultures and their corresponding sera. He furthermore determined that the reaction observed by him was a specific one, obtained only with bacterial cultures and homologous sera, and not with heterologous fluids. He also found that the bacterial substance to which the reaction is due, originated within the bacterial cell. Nicolle, (*Annales de l 'Institut Pasteur,* 12) and others, repeated, confirmed, and extended the observations, and we now know that this specific reaction holds good with all bacteria to which animals have been immunized, diphtheria cultures being an exception to this, according to Castellani (*Lancet,* 1902, June 28). Kraus (*Wiener klin. Wochenschrift,* 1901, Vol. 14, 693-695) has demonstrated that where there

is specific agglutination, there is specific precipitation. Specific precipitates are consequently of the same diagnostic value as agglutination, a discovery which it seems to us may be of the greatest practical value, and places the specific typhoid and other blood reactions within the reach of all.

The substance in the serum which enters into this reaction is known as the precipitin and the precipitate thus formed is designated as the precipitum. It soon was found that specific precipitins could be obtained for all the proteids.

Injections of crystallized albumin from hens' eggs (Myers, *The Lancet,* Vol. 2, 1900), give rise, in the blood of the animal injected, to a serum (ovaserum) containing a very powerful precipitin, which forms a dense precipitum with albumin from hen's egg, forming also a precipitum, but a very much slighter one, with the albumin from ducks' and from pigeons' eggs. No reaction was obtained with other proteids. Uhlenhuth (*Deutsche med. Wochenschrift,* 1900) found ovaserum not only specific, but also the most delicate reagent for egg albumin thus far discovered. A few drops of it added to egg albumin, diluted with 100,000 parts of water, gave a distinct cloudiness, while nitric acid, acetic acid and potassium ferrocyanid failed to indicate albumin in a dilution of 1:1000. Uhlenhuth also obtained feebly acting ovaserum by prolonged and excessive oral feeding of rabbits with egg albumin.

Sheep serum globulin injections produce a specific precipitin for sheep's globulin, which also gives a slight precipitum with globulin obtained from bullock's serum; but has no action on egg albumin.

Animals treated with peptones furnish a serum, which forms a precipitum with peptone and fails to react with any other proteid.

Bordet, Wasserman and Schütze (*Deutsche med. Wochenschrift,* 1900) have shown that injections of milk into rabbits furnish a serum (lactoserum) whose precipitin in all cases is specific for the proteids of the milk of

that species of animals, whose milk has been injected. This also refers to human milk. It shows that the milk proteids of each species of animal differ from the milk proteids of every other species; furthermore, that it is impossible by any chemical process to make cow's milk exactly like human milk. As injections of emulsions of the cells of the udders of animals furnish specific lactosera (Fisch, *St. Louis Courier of Med.*, 1900), we have a demonstration that some of the milk constituents result from a direct transformation of the gland cells. Injections of semen produce semen precipitins (Farnum, *Jour. Am. Med. Assoc.*, 1901).

But probably the most interesting and perhaps the most important and most thorough of these studies have been made on the precipitins for the proteids of blood serum, which have culminated in the establishment of a most delicate means for detection of the source of blood specimens, promising to be of the greatest importance in forensic medicine. By numerous observers, the following has been established: The serum of an animal of species "A" injected with serum of an animal of species "B" develops specific precipitating powers for serum of species "B." Such serum is called antiserum.

Nuttall (*British Med. Jour.*, April 5th, 1902), who has tested over 500 different bloods, has most accurately defined the limits of specificity of this reaction. He finds that a powerful antiserum for any mammalian blood will produce a varying amount of clouding in all mammalian bloods (Mammalian reaction); but it is much less and slower than in the homologous blood, so that it never could be mistaken for a full reaction. The degree of reaction, which can be accurately measured, seems to give a measure of blood relationship between the various species. Thus with antihuman serum, that of the anthropoid apes (gorilla, orang, chimpanzee) gives a precipitum apparently equal in quantity to that of the human; that of the old-world monkeys (Cercopithecidæ) gives less, that

of the new-world simian families (Hapalidæ, Cebidæ) still less, that of lemur none. Antihorse serum gives precipitum only with horse, and with donkey blood. Anti-ox and anti-sheep serum acts to a greater or less degree on blood of other true ruminants. No anti-mammalian serum ever produces even the faintest clouding in avian, reptilian, batrachian or crustacean bloods. The avian, reptilian, etc., reactions seem to have the same peculiarity. For technique see Biondi (*Viertel-Jahresschrift für gerichliche Med., Suppl.* Heft, April, 1902), also Nuttall. Injections of human albuminous urine, pleuritic and peritoneal exudates from man have by many observers been found to give rise to specific antiserum for all the various liquids mentioned and for human serum; but not for normal urine, nor for other liquids. This shows the identity of the proteids of all those liquids that are precipitated.

The precipitins are remarkably stable bodies, quite resistant to heat (60 deg. C. for one hour or more), likewise to chemicals. Myers has shown that the precipitin is used up in the course of its reaction, which, together with its specificity, makes it safe to conclude that the action is purely chemical. Further than this we know nothing concerning the nature of the precipitin, nor of the precipitum.

At the same time, while a serum becomes specifically precipitating, it seems also to become specifically anticoagulative for the blood injected, according to the studies of Bordet and Gengou (*Ann. de l'Institut Pasteur,* 1901, Vol. 15, 129), of Camus, and others; which points to the conclusion that even the fibrin ferments of various species are not quite identical.

In this manner, a wonderful heretofore undreamt of complexity in the proteid molecule has been unveiled. Every species of animals seems to possess its own species of proteid molecules. It seems that the vegetable albumins differ less from one another than the animal albumins. (Kowarski, *Deutsche med. Wochenschrift,* 1901, Vol. 27, 442.)

The Agglutinins.

The animal organism is capable of producing specific antibodies, not only against cell products, but also against cells. It is probably quite well known that agglutination of microorganisms is produced by mixing a culture of bacteria with the serum of an animal immunized to that organism; furthermore, that agglutination is obtained not only in immune, but also in infected animals. Although the bacteria are not necessarily killed by the agglutination, we may look upon agglutination as an evidence of at least detrimental effect upon the growth and virulence of the microorganisms.

The question of the specificity of this reaction is of course of the greatest practical importance, and has been answered thus: The cultures of a microbe freed from the microbe by filtration, dialysis, or centrifugalization, have a distinct though feeble agglutinating effect upon that particular microbe. (Ruffer and Crendiropoulo, *British Med. Jour.,* April 5, 1902, 821.) The normal serum of animals is capable of manifesting a slight agglutinating action upon certain bacteria, especially the colon bacillus and the bacillus of Eberth. The serum of infected animals also has some agglutinating power for other closely related organisms. Still, in all of these reactions, there is easily observable a quantitative difference between the specific and the non-specific reaction. So that if in a certain dilution (1:60) and in a certain time-limit (30 minutes), agglutination occurs, evidence of specific reaction is quite positive. Of course, absence of specific agglutination does not exclude the specific disease. On the whole the agglutination test does not have quite that specificity which is possessed by the precipitins.

It is quite clear that in agglutination there must be two factors; one of them found in the serum, which we may designate the agglutinin; the other furnished by the bacterial culture, which may be denominated the agglutinable

substance. The product which results from the reaction of these bodies, may be called the agglutinate. The agglutinins seem to be fairly stable bodies, and some of them may be heated to 140° without destruction; neither antiseptics, digestive ferments, nor putrefaction destroy them. They are to be found in other fluids of the body, besides the blood; they have been found in the urine, in the tears, in the milk; however, so variable and small in quantity as not to be available for practical use. (Vaughan and Novy, Cellular Toxins, 4th ed., Phila., 1902.) The agglutinable substance is likewise quite resistant; it is not destroyed when the organism is killed by heat or by disinfectants. Indeed it was the announcement of this by Widal (*La Semaine Med.*, 1897) that led Kraus to try the effect of mixing filtered culture with homologous serum, which resulted in the discovery of the specific precipitins.

It seems that the polymorphonuclear leucocytes are the source of the agglutinin on the following evidence: Red corpuscles contain no trace of it; the polymorphonuclear leucocyte always possesses an agglutinating power, greater than, or more rarely equal to, that of the serum (Ruffer and Crendiropoulo).

To explain the mechanism of agglutination there are at present two classes of theories, the physical and the chemical. Brunton (*Jour. Path. and Bact.*, 1900, Vol. 7, 53) demonstrated the physical theory quite well by the following simple experiment: If lucifer matches are covered with hard soap and thrown into water, they will at once draw together in clumps on the addition of a little acid; if, now, a solution of caustic potash is poured in, the clumps will not re-form when broken up. This phenomenon is probably due to changes in surface tension. Of the chemical theories, that of Nicolle seems to us the most reasonable. The agglutinable substance formed within the bacterial cell and most abundant in the cell membrane diffuses through the culture medium to a greater or less extent; it is precipitated by the agglutinin with the for-

mation of small coagula, which surround the cells involving the microorganisms in the floccules in a mechanical manner. Ehrlich considers the agglutinin to be a peculiar kind of receptor, which, besides a catching (haptophore) group, also contains a ferment (zymophore) group, and that the change is due to ferment action on the cell wall. (See also Carl Fisch, *St. Louis Courier of Med.*, March, 1902.)

The Lysins.

We must distinguish clearly between bacterial and toxin immunity. An animal may be immune to the toxin and not to the bacterium and vice versa. Antitoxic serum, *e. g.*, diphtheria, may still be a good culture medium for the microorganism. Bacterial immunity is obtained by means of a bacteria dissolving substance (bacteriolysin); this does not act against the toxin. As is well known, normal blood serum is somewhat bacteriolytic, so are some old bacterial cultures; but under the influence of microorganisms on the body specific bacteriolysins are developed. The specificity in this case is not strictly limited; the sera of certain immunized animals have a bactericidal action not only on their homologous bacteria, but on closely related organisms as well, and sometimes even upon organisms that are not closely related (Issaeff).

Within the last few years a marked resemblance was discovered between the properties of the specific bacteriolysins and hemolysins, as well as the processes which lead to their production. It has been found, in practically all respects, that what is true of one is also true of the other. A great deal of work has been done upon the hemolysins, mainly on account of this resemblance and the greater ease of experimentation with hemolysins.

By experimenting on the transfusion of blood, various observers have found that transfusion of blood from another species into an animal is dangerous. The danger arises from two sources: 1. Clumping of the red blood

corpuscles, with the production of multiple embolism; 2. Solution of red blood corpuscles in the foreign serum. Great variation was found in the relation of various bloods to each other. In some, clumping was absent; some sera were found actively hemolytic, *e. g.*, dogs'; while others, horses' and rabbits' sera, are but slowly so. Likewise does the resistance of blood corpuscles vary toward heterogeneous sera; thus dogs' and cats' blood corpuscles are very resistant, while rabbits' are very readily dissolved by most sera. On the basis of these observations, it is concluded that in man the transfusion of blood from other animals is not permissible under any circumstances (Landois).

In 1898, Belfanti and Carbone, and independently, Bordet, determined the fact that subcutaneous or intraperitoneal injection of defibrinated blood produces in the blood serum of the operated animal, a peculiar poison (hemolysin), which has a specific solvent action on the blood corpuscles of that species of animal, whose blood was injected. This remarkable observation was corroborated by a large number of authors. Recently, Metalnikoff (*Centralblatt f. Bact.*, 1901, Vol. 29, 531) found that even blood feeding may produce hemolytic serum. This may explain why dogs' serum is so actively hemolytic normally.

Normal urine is not hemolytic. It becomes so on prolonged exclusive milk diet. (Sabrazès and Fauquet, C. R. Soc. de Biol., 1901, Vol. 53, p. 273). This may be due to change in concentration of the urine, and not to deficiency in chlorids, as thought the observers mentioned, for Amédée Pugnat (Ibid., p. 395) found that urine of 9 cases of pneumonia (a disease in which chlorids are markedly deficient in urine) did not have hemolytic action.

Normally, blood of the same species does not act hemolytic, although it must be remembered that this may occur and that curiously enough Halban (*Wiener klin. Wochenschrift,* 1900), also Halban and Landsteiner (*Münch. med. Wochenschrift,* 1902, 12, p. 475) have found not only agglutinins, but also lysins in the blood of

the mother for that of the fetus, and more rarely vice versa. By injecting a goat with blood from other goats, Ehrlich and Morgenroth (*Berliner klin. Wochenschrift,* 1900, 453) obtained a serum that dissolved the blood corpuscles of other goats; they called such serum isolytic, *i. e.,* dissolving the blood corpuscles of the same species of animal. An autolytic serum, *i. e.,* one that would dissolve the corpuscles of the individual, furnishing the blood, has never been discovered.

It has furthermore been shown that repeated injections of hemolytic serum into an animal whose red corpuscles are susceptible, gives rise to the development of antihemolysins, *i. e.,* of substances that protect the corpuscles against the hemolysin. Theodor Müller (*Centralblatt f. Bact.,* 1901, Vol. 29, 860) and Paul Müller (Ibid., p. 175) have found antihemolytic substances in certain normal sera.

Specific agglutinating and hemolytic substances seem to pass into the urine, as has been shown by Friedberger (*Berl. klin. Wochenschrift,* 1900, Vol. 37, p. 1236). On the other hand, it is claimed that injections of urine give rise to agglutinin and hemolysin for the species furnishing the urine. Heating the urine to 100° C. for five minutes destroys the power to produce lysins. (Schattenfroh, *Münchener med. Woch.,* 1901, Vol. 48, p. 1239.)

It is natural to suspect that lysins and agglutinins are one and the same substance, but that they are not identical has been shown quite positively by Pfeiffer and Kolle (*Cent. f. Bact.,* 20), Fränkel and Otto (*Muench. med. Wochenschrift,* 1894), Widal and Sicard (*C. R. Soc. de Biol.,* 11, XI.), quoted by Vaughan and Novy. Both the bacteriolytic and the hemolytic power of the blood depend on complex proteid bodies, somewhat resembling ferments. Both are rendered inactive by warming; and, what is most remarkable, have their activity restored by normal serum. This peculiarity has given rise to a good deal of speculation. It can be explained only by assuming that the lysin consists of two parts, one a thermostable specific body

found only in the specific serum, the other a thermo-labile ferment-like body found also in normal serum. Authors have not yet agreed upon the names to be applied to these parts. The thermostable specific body has been called "immune body" by Pfeiffer, "intermediary body" by Ehrlich, "sensitizer" by Bordet, "copula" by Müller, "desmon" by London, "philocytase" by Metschnikoff. The thermolabile body has been designated as the "complement" by Ehrlich, "alexin" by Bordet, "cytase" by Metschnikoff. Following the prevailing custom in this country, we shall use Ehrlich's nomenclature in the present discussion.

From what has been said it will be seen that this much is established regarding the nature of the lysin, that the specific intermediary body in the lysin is necessary to enable the non-specific complement to act on the cells. Both anti-intermediary bodies and anti-complements can be prepared by using the one or the other part of the lysin in immunization.

As to the place of formation of the lysins, all observers agree in assigning a very prominent part to the leucocytes. The school of Metschnikoff believes they are the exclusive source; and indeed the phenomenon of phagocytosis can be explained only on the assumption that the phagocyte contains some chemic substance by virtue of which it dissolves the captured organism. On the other hand, Pfeiffer and Wasserman believe they have determined that the lysins are mainly formed in the blood-making organs. At any rate, in the normal serum, the polymorphonuclear leucocytes seem to constitute the principal source of the complement.

That this subject is pregnant with practical importance will be gathered from the following: It has been suggested that the various anti-bacterial sera which have proved therapeutic failures are rich in the intermediary body, but too poor in the complement. By increasing sufficiently the quantity of the latter, many sera may become therapeutically efficient in the human subject. Acting on this hypothesis Wasserman added fresh serum of nor-

mal animals to anti-bacterial typhoid serum. By using this he has succeeded in keeping alive guinea pigs so infected with typhoid organisms, as invariably to die when treated with the almost useless anti-bacterial serum only.

Clinical applications of hemolysis have been attempted, based on the fact that normal human serum rarely affects the corpuscles of another individual. Ascoli (*Muenchener med. Wochenschrift,* 1901, Vol. 48, p. 1239) finds that, in anemia, agglutination and hemolysis readily occur. Camus and Pagniez corroborate this, and in addition record agglutinating properties in various cachexiæ, especially in tuberculosis. Monaco and Panichi have shown that the serum of malaria patients possesses agglutinating properties for the red blood corpuscles of other persons, which, after treatment with quinin and after recovery, rapidly disappear. Grijoni (*Gaz. degli. Ospedali,* May 12, 1901) believes that this may be of diagnostic value in latent malaria. Widal states that the serum of typhoid patients causes rapid diffusion of the hemoglobin of corpuscles of normal individuals, but does not affect those of typhoid patients.

The mechanism of cytolytic action has been the subject of a considerable amount of scientific contention. The opinions held regarding the matter may, as in the case of agglutination, be divided into two classes, the physical and the chemical.

It is a well-known fact that removal of cells, be they erythrocytes or bacteria, from one medium into another containing slightly more or slightly less of certain crystalloids, may be followed by death and speedy dissolution of the cells thus exposed. These changes seem mainly to be due to osmotic currents, resulting in introduction into the cells of amounts of water which become incompatible with the further maintenance of life. An agent that acts mainly in this manner on red blood corpuscles is ammonium chlorid. Bordet, Nolf (*Ann. de l'Inst. Pasteur,* 1901, Vol. 15, p. 303) and others, mainly French scientists, believe that the lysins act by producing hydration of the stroma,

which then permits the hemoglobin to diffuse into the medium, an action comparable in certain respects to that of ammonium chlorid. They explain the action of the two parts of the lysin by assuming that the intermediary body acts as a mordant (Bordet's sensitizer), modifying the cell so that it then directly absorbs the complement (alexin) which increases the affinity of the cell for water, producing hydration. They base their position on Nolf's demonstration that the alexins, contrary to Buchner's theory, do not have any peptonizing action on hemoglobin, nor on the other proteids of the corpuscles.

While it is quite generally agreed by the other contestants that osmotic disturbances may play a part in cytolysis, they assign the most important part to a cytotoxin, a specific cell poison of organic nature, probably a ferment, though not necessarily peptonizing. All protoplasm poisons are capable of dissolving red blood corpuscles. While some of the chemically well defined poisons do so, *e. g.*, saponins, helvellic acid, aromatic amines, aldehydes, etc., the toxins are especially prominent in their hemolytic power. The toxic plant albumoses, *e. g.*, ricin and abrin, the snake venoms, many bacterial poisons as, *e. g.*, filtered pyocyaneus culture, are all markedly agglutinating and hemolytic. The specific hemolysins resemble the toxins not only in their complex organic nature, but also in being capable of giving rise to antibodies, which protect the corpuscles from their action.

Here, too, Ehrlich has a fascinating theory to offer. The cause of the toxic action of the lysins is the presence of suitable receptors in the cell acted on. These receptors thrown off become the anti-hemolysins. The poison, consisting of two parts, must have in its intermediary body a molecule having two affinities, represented by two different atom groups, the one attaching it to the cell, the other combining with the ferment-like complement, and thus the complement is introduced into and enabled to act on the cell protoplasm. The intermediary body then would act after the manner of a double anchor.

In the receptor apparatus of the red blood corpuscles, Ehrlich sees again a provision for the taking up of food. And, inasmuch as the life of a red blood cell is minimal, he assumes that the substances taken up do not serve for their own use, but are given up to other organs; in other words, the red blood corpuscles are provisional storage centers for food. (!)

The weak point in Ehrlich's theory is well taken hold of by Gruber. (*Muenchener med. Wochenschrift*, 1901, No. 49.) He says in substance, that the more clearly we recognize that the number of possible antibodies is almost infinite, and each must differ from every other one as they are so prominently specific, protecting only against the substance by which they have been formed through immunization, the more improbable becomes the hypothesis that they are normal body constituents (food receptors), the more necessary becomes the assumption that the antibodies are in generic relation to the substances which they antagonize. No matter what species is immunized always the same diphtheria antitoxin is produced. This last statement is disproved by E. P. Pick (*Hofmeister's Beitr. z. chem. Physiol. u. Path.*, July 9, p. 351—Abstr. *Centralb. f. Phys.*, XVI., I., 4), who by fractional precipitation methods finds distinct differences in analogous antitoxins, *e. g.*, the diphtheria antitoxin of horse and of goat. Nevertheless, Gruber's conclusion, "It may be assumed that the antibodies are derivatives of the foreign bodies against which they act," though losing a little of its force cannot be considered disproved by Pick's observation.

To show that there is experimental weight on the side of Gruber's theory, as well as on account of its intrinsic value, we wish to call attention to Emmerich's theory of immunity as elaborated in two papers by Emmerich and Löw (*Zeitsch f. Hygiene*, 1899, 31; 1901, 36). They base their theory on the fact that many bacteria, and among these some of the most important pathogenic ones, produce in liquid cultures enzymes which are capable of

digesting the organisms which produce them. They propose to call these enzymes nucleases, because they digest the nucleo-proteids of the bacterial cells. Special enzymes are designated by names derived from those of the bacteria which produce them, as pyocyanase, cholerase, etc. They find that some of these ferments dissolve only the bacteria that produced them, while others, *e. g.*, pyocyanase, have bacteriolytic action upon other organisms as well; pyocyanase digesting the typhoid, cholera, pest and diphtheria organisms. To such enzymes is due the curative action of bacterial cultures. Agglutination is nothing more than the first stage of bacteriolytic action of enzymes. Artificial immunization is due to the gradual formation within the body of a compound of the bacteriolytic enzyme with some albuminous substance probably derived from the leucocytes; such combinations are designated immune-proteids. They may be prepared artificially by allowing spleen pulp to be digested in a concentrated solution of bacterial ferment obtained by purifying and concentrating old filtered cultures. These immune-proteids are not only energetically bacteriolytic but some of them are even antitoxic. Thus pyocyanase, with which these investigators have principally experimented, protects animals which have been treated with lethal doses of diphtheria toxin. They have used artificially prepared pyocyanase-immune-proteid successfully in the treatment of anthrax. The importance of these observations, provided they are confirmed by others, can hardly be overestimated. They seem to have succeeded in preparing antitoxin artificially. If their statements be confirmed, Ehrlich's theory will have to be considerably modified. For it must be admitted to be in the range of possibility that antitoxins may contain a ferment derived from the toxins, which in the animal body during the process of immunization has combined with the constituents of certain tissues. (Vaughan and Novy, l. c.). Final decision on this matter must await future investigations.

The Cytotoxins.

The lysins just described belong to this class of specific cell poisons, for which Metchnikoff has accepted the above name. However, the class is very much larger and, besides true lysins, dissolving substances, contains specific cell toxins that do not dissolve but in other manner injure the cells. They are the most recent development in the domain of antibodies and at present constitute a scientific wonderland with many as yet unconfirmed observations, direct contradictions, and brilliant but bold hypotheses and suggestions. Still there has enough accumulated, as will be seen, to make it safe to hope that we are on the track of important facts.

The preparation of all of these cytotoxic sera is similar. An emulsion of an organ is injected into an animal, preferably intraperitoneally. The serum thus obtained, it is claimed, acts in a specific manner upon these cells and organs that were injected and only of that species of animal from which the organ was obtained. Many of these seem to be additionally hemolytic.

1. *Leucotoxins* (Leucolysins) were obtained by Metchnikoff *(Ann. de l'Inst. Pasteur,* 1899), Funck and others by injection of emulsions of spleen and of mesenteric lymph glands. M. Franke (*Centralbl. für innere Medicin,* Feb. 8, 1902) even obtained human leucolytic serum from a case of lymphatic leukemia by injecting lymph glands removed from the patient's axilla into the peritoneal cavity of rabbits. The serum thus obtained seemed to have a much more marked effect on the patient's small leucocytes than on the polynuclears and other large forms. The patient was too ill to try the serum therapeutically. Besredka (quoted by Gruber) states that small quantities of leucotoxic serum cause marked hyperleucocytosis, which would well agree with Weigert's law. Inasmuch as leucocytes are certainly our main weapon against infections, there seems to be some hope from carefully guarded leuco-

toxin therapy. Incidentally it may be mentioned that Cantacuzene noted active production of erythrocytes after small quantities of hemolytic serum.

2. *Trichotoxins* (epitheliolysins) discovered by v. Dungern (*Münch. med. Wochenschrift,* 1899, 38) by injection of epithelial cells scraped from the trachea of freshly killed oxen. Later (*Münchener med. Wochenschrift,* 1900) he has shown that the lactosera act upon epithelial cells. He suggests the possibility of using an epitheliolysin in the destruction of unrecognizable cancer cells that may remain in the tissue after excision by the surgeon. It may be noted here that attempts at production of antisarcoma serum have been made by Louis Dor (*Gazette hebd. de Med. et de Chir.,* Feb. 14, 1901). Simon Flexner (*Assn. of Am. Phys.,* 17th An. Meeting, April 29, 1902) suggests that epitheliolysins may explain the lesions of cirrhosis.

3. *Spermatotoxins.* Spermatolysins, *i. e.,* toxins dissolving spermatozoa, have not yet been obtained. The toxins which have been obtained act rather as agglutinins. Landsteiner (*Centralb. f. Bakt.,* XXV., 1899), Metchnikoff (*Ann. l'Inst. Past.,* XIV., 1, 1900), Moxter (*Deutsche med. Wochenschrift,* 1900). It must be remembered that the blood of any animal contains substances antagonistic to the spermatozoa of any other irrespective of species; that an antagonism also exists between the blood and the spermatozoa of the same individual. Metalnikoff (*Ann. de l'Inst. Past.,* 1900) prepared autospermatotoxin. The action of specific bodies has even been applied to problems of fertilization. v. Dungern (*Centralb. f. Phys.,* XV., p. 1) attempts to explain by them the reason why eggs are in general fertilized only by spermatozoa of the same species. Thus he finds in the eggs of the star fish toxins for the spermatozoa of the sea-urchin. However, he does not find such toxic bodies sufficiently general in distribution. Whereupon he formulates the following hypothesis: The protoplasm of ova lessens the motion of homologous spermatozoa and thus enables them to assume the radial posi-

tion necessary for penetration; it increases the motion of heterologous spermatozoa which causes them to wander away from the ovum, or to assume tangential position which makes penetration impossible. That the protoplasm of ova and spermatozoa of the same species is identical he attempts to prove by injecting these into rabbits and finding the serum obtained by injection of ova even more sperm agglutinative than that obtained from spermatozoal injection (*Zeitsch. f. allg. Phys.*, 1, p. 34).

4. *Nephrotoxin,* obtained by W. Lindemann (*Ann. l'Inst. Past.*, 1900, No. 2), Néfédieff (Ibid., 1901, XV.), Bierry (*Comp. rend. de Soc. biol.*, 1901, 839). Néfédieff has further prepared what might be called an isolytic nephrotoxin by tying the ureter of a rabbit, which bore the operation well, and whose blood injected into another rabbit 41 days after the ligation produced albuminuria due to diffuse nephritis.

5. *Hepatotoxin,* obtained by Delezenne (*La Semaine med.*, 1900, 290), Schütze (*Deutsche med. Wochenschrift,* 1900), was unable to obtain either nephrotoxic or hepatotoxic sera.

6. *Pancreotoxin,* by Surmont (*La Semaine méd.*, 1901, No. 19).

7. *Adrenotoxin,* by Bigart and Bernard (*La Semaine méd.*, 1901, No. 8).

8. *Thyreotoxin,* by N. Gontscharukov (*Centralblatt f. allg. Path. and path. Anat.*, March 5, 1902, p. 121).

9. *Neurotoxin,* by Enriquez and Sicard (*La Semaine méd.*, 1900, 388), Delezenne (*La Semaine méd.*, 1901, No. 10). Only intracerebral injections of the serum seem to be active; subcutaneous or intravascular injections are negative, possibly because the endothelial cells protect the brain substance.

10. Even *Placentolysin* and *Syncytiolysin* is claimed by Veit (*Centralblatt f. allg. Path. u. path. Anat.*, 1901, XII., 642).

The cytotoxins obey the same general laws as the hemolysins. They lose their toxic property by being heated to

moderate temperature and are easily regenerated on the addition of the serum of a normal animal. If the host of witnesses we have just quoted is not very much mistaken, it is established that not only does every species of animal possess its own species of proteid molecule, but also that the proteids of the various organs of each species differ from one another.

Summarizing the whole matter, it seems that a new biologic law has been established: Foreign proteid molecules acting on certain living cells give rise to the production of chemical bodies having a specific relation to the substance under the influence of which they were produced; such bodies may be called antibodies.

SECTION II.

PATHOLOGY.

GENERAL PATHOLOGY.

The Protozoon of Cancer. Harvey R. Gaylord. (*American Journal Medical Sciences,* May, 1901.)

The author was appointed to investigate the parasites of cancer, and his preliminary report says:

"We have discovered in all of the cases of cancer so far examined that by fresh methods the organisms can always be found. These bodies resemble fat in the fresh state. It was only when we applied the ether test and the osmic acid test that we discovered that they were not particles of fat. We next discovered that we could scratch their edges with the cover glass. We next injected them into the abdominal cavities of animals. Most of the animals developed peritonitis, and large quantities of these bodies could be obtained from the peritoneal fluid. We have observed forms develop under the cover glass. Slides taken from fluid and incubated for a period of 3 or 4 days in the thermostat showed that the bodies not only changed their form, but we were able to trace the development of the larger structures from the small hyaline form and in a number of organisms we found pseudopodia sent out toward the neighboring air bubbles. The organisms either increase very rapidly during the period just before death or they proliferate in the tissue after death. The relative size gradually increases and they finally become granulated, and if kept upon a warm stage ultimately throw out pseudopodia, develop a nucleus, and end by turning into a sac containing the spores of the organism."

All the organs, including the blood taken from all regions of all cases dying of cancer, including sarcoma and epithelioma, contain large numbers of the organisms.

After investigating various stains the author believes that Plimmer's method for the staining of the organisms is the most satisfactory, but he calls particular attention to the use of the peroxid of hydrogen, as this is a very necessary step in the process and one on which Plimmer laid but little stress.

PLIMMER'S METHOD.

1—Small slices of tissue are hardened in Hermans's fluid 12-24 hours.

2—Wash in running water 12-24 hours.

3—Harden in alcohol, embed in paraffin.

4—Remove paraffin in xylol.

5—Absolute alcohol.

6—Peroxid of hydrogen until the black is removed from the section and no further bubbles form upon the surface, ¼-½ hour.

7—Wash in water.

8—Stain with Heidenhain's iron hematoxylin or Mallory's simple iron hematoxylin.

9—Wash in running water 3-6 hours.

10—Stain in 1 per cent Ehrlich's neutral red or Bordeaux red. (This must be kept neutral. When acid it must be neutralized with alkali.)

After staining with iron hematoxylin the differentiation must be continued until the protoplasm is colorless. The amount of red in the protoplasm must be controlled under the microscope. Parasitic bodies in cancer and yeast organisms in the tissue are stained yellowish red or copper red; nuclei, black; connective tissue, brilliant red.

"We convinced ourselves that the organism with which we were dealing was a protozoon, belonging in the same group with the vaccine organism, and it remains to be seen what evidence can be produced to show that these organ-

isms, which are a constant occurrence both in the fresh material of cancer and that which we had cultivated and identified in the tissue under the form of Russell's bodies, Plimmer's bodies, etc., are the cause of cancer. Fourteen guinea pigs, inoculated in the peritoneum with peritoneal fluid containing the organisms, gave an average length of life of 58 days. Four inoculated in the peritoneum with cancer mush gave an average of 57 days. Eleven inoculated in the peritoneum with dried cancerous lymph nodes gave an average of 45 4-11 days. Six inoculated with peritoneal fluid and lymph nodes from animals which were infected in the above manner gave an average of 29 days. By growing the organisms in a colloid sac in the peritoneal cavity of a rabbit and then inoculating a rabbit in the ear vein death resulted in 15 days."

Cell Inclusions. Greenough. (*Journal of Medical Research,* April, 1902.)

The author concludes: 1. Cell inclusions of a constant type are found in practically all cases of cancer of the mammary gland. 2. They are also found in noncancerous disease of the mammary gland. 3. They are not found in epithelioma or sarcoma. 4. Their appearance, staining reaction and situation in the cell are such as to justify the hypothesis that they are the result of secretory activity of the epithelial cells. 5. There is no cause for attributing any parasitic qualities to them.

Coccidium Infection of the Rabbit's Liver. Tyzzer. (*Journal of Medical Research,* April, 1902, Vol. VII., No. 3.)

The author concludes that this parasite resembles the cell inclusions of cancer in only one stage. The immediate effect of the parasite upon the host is to produce degeneration and destruction of the epithelial cells of the bile ducts. Secondary to this the effects of irritation are seen in the proliferation of connective tissue and epithelium. The more remote effect is cirrhosis.

Culture Experiments with Malignant Tumors. Oscar

Richardson. (*Journal of Medical Research,* Vol. VII., No. 3.)

The author announces that he has been unable to cultivate anything which can be regarded as a specific infecting organism.

Four Pathogenic Torulae (Blastomycetes). J. D. Weis. (*Journal of Medical Research,* Vol. VIII., No. 3, April, 1902.)

The author recounts his observations on various fungi, including those of San Felice and Plummer.

The Relation of Blastomycetes to Cancer. Nichols. (*Journal of Medical Research,* Vol. VII., April, 1902.)

This study concerns many features of this question. He inoculated animals in various localities with various forms of blastomycetes and studied the lesions produced. He concludes that the reaction is a connective tissue process. Involvement of the neighboring glands and eventually internal metastases were the rule. His further conclusions will be considered under the general summary of this series of articles.

This and the four preceding articles constitute the 2d annual report of the Cancer Committee of Harvard.

Nichols writes a summary. He states the position of those who believe in the parasitic origin of carcinoma. He then concludes:

1. The lesion produced by Coccidium Oviforme is essentially a process of chronic inflammation and is not analogous to the lesion seen in cancer.

2. The lesion in Molluscum Contagiosum as characterized by certain changes in the epidermis, is not due to the action of a protozoon and is not analogous to cancer.

3. The so-called blastomycetes of San Felice and Plimmer are similar.

4. The lesions produced by these blastomycetes are essentially nodules of peculiar granulation tissue, are not cancerous, nor in any sense true tumors.

5. Blastomycetes are not constantly present in human cancers.

6. The peculiar bodies seen in the protoplasm of cancer cells are not parasites nor the cause of the lesions, but probably are in part at least atypical stages of the process of secretion by glandular epithelium.

The Pathogenesis of Cancer. John Marnack. (*London Lancet,* July 6, 1901.)

Planting of epidermis beneath connective tissue failed to produce any growth, the pieces drying up in every case. Ljunggren and Wenscher sterilized patches of human skin and kept them in sterile salt solution. These being inoculated into a granulating area developed into a growth and continued to live. The author's experiments do not agree with this finding.

Our Present Position in Regard to Mammary Cancer. Wm. M. Banks. (*Liverpool Med. and Chir. Journal,* March, 1902.)

The author says that in 50 years the death rate from cancer has increased between four and five times, the increase being more marked in males. He believes there is nothing constitutional about cancer, but the tendency is transmissible from parent to child. Trauma is sometimes a means of starting the disease. As to the parasitic and infectious view of cancer the author says:

1. There is plainly a structure of definite nature which is found in man at the growing edges of carcinomata. It is not found in any healthy tissue, nor in any other neoplasm except sarcoma. It used to be regarded as a protozoon or coccidium, but many investigators seem now to regard it as a blastomyces, which is a form of sacchromyces, reckoned to be a developmental stage of certain fungi. Most parasites are inside the epithelial cancer cells, some are outside.

On the Parasite of Cancer. Von Leyden. (*Wien. med. Woch.,* May 17, 1902.)

The author calls attention to certain numerous conditions in plants in which an amœbic parasite is certainly demonstrated as a cause. Arguing for the parasitic origin he thinks that the life history of the carcinoma, the clinical

picture, the anemia, the increase of indican, and the diazo, all demonstrate some living parasitic cause. The author refers to dogs in which carcinoma has been experimentally produced. He gives a minute morphological description of an intracellular parasite which he believes stands in an etiologic relation to carcinoma.

On the Parasitic Nature of Carcinomata. Ribbert. (*Deutsch. med. Woch.,* Nov. 21, 1901.)

The writer does not believe that any bacterium, mould or protozoa has been proven to stand in etiologic relation, nor does he believe in infecting cells, nor in symbiosis of cells. He argues for a pathology beginning in the connective tissue of an epithelial area, separating epithelial cells from their proper relations, and stimulating their vegetative activity.

Etiology of Carcinoma and Autoimplantation of Carcinoma Cells into the Walls of the Stomach and into the Lung. Gustav Futterer. (*Medicine,* March, 1902.)

The first point that the author discusses is etiology of carcinoma, and after reviewing certain phases, especially the theory of transplantation of elements, he asserts his conception of the origin of carcinoma.

Normal epithelial cells exposed to chronic diseases of the circulation undergo various changes in form and function and enter into abnormal groups. The major factor is mechanical trauma. This presses the epithelial cells into the underlying tissue and surrounding this are zones of sprouting blood vessels with more or less edema and cellular infiltration. From this primary focus metastases occur. There is considerable probability of physiologic activity in both the primary and secondary growths.

The second question considered is the metastatic spreading of carcinoma along routes other than those usually considered, for instance, spreading of carcinoma from one part of the digestive tract to another, the route being along the lumen of the digestive tract. The same holds true for the air ways and peritoneal surfaces. The article is philo-

sophical and is accompanied by a bibliography with 56 references.

Cancer Distribution and Statistics in Buffalo for the Period 1880 to 1899, with Special Reference to the Parasitic Theory. Irving Phillips Lyon. (*Am. Jour. Med. Sciences,* June, 1901.)

The house distribution on the map shows an area of marked concentration in the German wards. No other relation than that of race can be determined to exist between the area of concentration and local conditions. That there is a real relation between this local concentration and race (German) is further indicated by the race table, which shows that cancer is many times more frequent among the foreign born and particularly the Germans than the native born. This latter fact is also verified by the United States census for 28 large cities.

The Germans (and Poles) were further especially distinguished from other classes by the high rate (43.8 per cent) of involvement of the stomach 2.08 times the rate shown by the native born. Such high figures seem hard to explain on the embryonic theory and tend to support the parasitic theory of cancer by supposing that the peculiar diet of the Germans is more liable to contamination with the parasite of cancer than the more ordinary diet of other classes.

Cancer of the uterus and breast in Germans (and Poles) was correspondingly low, being hardly more than one-half as frequent as in the native born.

An increase in the general cancer rate from 32 to 53 per 100,000 of population (65 per cent) took place from 1880 to 1899. The rate of increase is shown to depend in part at least upon changes in the proportion of foreign born, because the cancer rate in the foreign born is so much higher than in the native born.

Excess of Salt in the Diet, a Factor in the Causes of Cancer. James Braithwaite. (*London Lancet,* Dec. 7, 1901.)

The author argues that cancer is in some measure due

to the eating of salt. He claims that savages who eat no salt do not have cancer. That the eaters of pork and other salted meats are particularly subject to it. That the Jews eating very little salt have very little cancer.

On the Transplantation of Tumors. Leo Loeb. (*Journal Med. Research,* July, 1901, and *Virchow's Archives,* 1902.)

The author successfully transplanted a sarcoma found in the thyroid of a white rat. Three hundred and sixty pieces were transplanted into about 150 animals, several pieces were transplanted each time to avoid accidental findings and pieces were removed at various periods from 6 hours to 3 months to study the development of the tumor.

It was impossible to transmit it by feeding it to rats, and it was also impossible to successfully transplant it into guinea pigs.

The largest part of the transplanted piece in each case became necrotic, but around the periphery the tumor began to grow into the connective tissue and in from 7 to 17, usually from 9 to 14, days the connective tissue began to be transformed into the tumor, or else the tumor cells lying in this connective tissue framework gave rise to the tumor.

From the first to the last piece examined the character of the tumor was preserved during these 15 months even after so many pieces had been successfully transplanted. Its physiologic character also remained the same and its rapidity of growth was about the same. Local metastases were of quite frequent occurrence.

The cases where the growth seemed discontinued for a time were probably due to pressure of the surrounding connective tissue, as they took on rapid growth when they were opened up, or pieces were implanted in other localities.

A Case of Multiple Endothelioma (Krukenberg's Tumor) of Bone-marrow. Carl Sternberg. (*Centralb. f. Path. u. path. Anat.,* No. 15, 1901.)

The autopsy showed no marked abnormalities except in the bones. On the outside the bones show no changes, but when sawed through the femur and humerus (right) showed that the marrow was traversed by small, soft, grayish white, spherical, sharply defined and projecting tumors of cherry size which contrasted well with the surrounding red-marrow. They were confined strictly to the marrow and never invaded the cortex. In the spongy zones of the epiphysis they were also present. The bony spiculæ were well preserved and there was neither rarification nor sclerosis. Tumors were present in the sternum, ribs, vertebræ, sacrum and cranial bones. Microscopically the tumors consisted of large, round, clear, inflated looking cells with crescentic well stained nuclei. The cell body is clear, blown up, the protoplasm recognizable only as a thin finely granular border at the periphery of the cells. Inflated cell parts did not stain with eosin. Between the cells there was a small plexus of narrow capillaries. The structure of these tumors corresponded to that of those reported by Krukenberg. It must be considered an endothelioma, not carcinoma.

Contribution to the Knowledge of Chloromata. W. Riser. (*Deutsch. Arch. f. klin. Med.,* Dec. 29, 1901.)

After minutely describing a case examined, and searching the recent literature, the author comes to the conclusion: That chloroma should be considered a lymphosarcoma of peculiar green color, which runs its course with clinical symptoms of leukemia, or pseudo-leukemia. There are many hypotheses concerning the origin of the green color, which the author discusses. The most probable, perhaps, is that the color is produced from some modification of hemoglobin—Langhan's Theory.

Association of Cancer and Tuberculosis, with the Report of a Case. G. W. McCaskey. (*Am. Jour. Med. Sciences,* July, 1902.)

After reporting a case verified by post-mortem examination and entering into quite a comprehensive discussion of

the relation of tuberculosis and carcinoma the author concludes:

1. Cancer and tuberculosis are so rarely associated in the same individual there must be an antagonism between the two diseases.

2. Autopsies on 281 cancer patients revealed only 1½ per cent of tuberculosis. This is nearly 20 times as little as in other people.

3. The antagonism is not diathetic, but is probably due to the chemical products of the two morbid processes, that of each being inimical to the other.

4. There is a rather intimate relationship existing between the two diseases in certain families, the existence of either appearing to favor the occurrence of the other.

5. The two diseases are not absolutely incompatible. They may exist in different parts of the same individual. They may exist in the same organ and even in the same tissue. In the latter case it is probable the primary disease was quiescent while the secondary developed.

6. In view of these apparent antagonisms and the occasional retrogression of cancer after the use of tuberculin, it may sometimes be worth while to try a systematic injection of tuberculin into cancerous tissue.

He gives a bibliography of 53 references.

Carcinoma and Tuberculosis in the Same Organ or Tissue. Moak. (*Journal of Medical Research,* Vol. VIII., No. 1, June, 1902.)

The author reports five cases. He discusses two questions: (1) The mode of origin of the hybrid disease. (2) Is there antagonism between them? As to the first, he concludes that tubercle bacilli can infect a carcinoma, or carcinoma can be implanted on a tubercular area. As to the second, he concludes that there is no antagonism between them.

Varieties of Cholesteatoma. J. Holinger. (*Trans. Chicago Path. Society,* Vol. IV.)

Congenital cholesteatoma is a rare tumor, growing in various parts of the body, mainly at the base of the brain

and in the testicle. It usually makes no symptoms but is an accidental find at post-mortems.

Cholesteatoma, or acquired cholesteatoma is a tumor growing in the temporal bone and quite frequently causes death by breaking through into the lateral sinus, the dura and the pia, causing thrombophlebitis of the sinus, meningitis, or abscess of the brain.

Multiple Primary Malignant Tumors — Report of a Primary Sarco-carcinoma in the Thyroid of a Dog, with Mixed Sarcomatous and Carcinomatous Metastases. H. G. Wells. (*Trans. Chicago Path. Society,* Vol. IV.)

The author concludes that carcinoma and sarcoma may occur simultaneously in the body of an individual as separate growths. This combination is no more frequent than is readily explained by assuming it to be a mere coincidence and there is no evidence that the presence of carcinoma in any way predisposes the individual to development of sarcoma, or conversely. Sarco-carcinoma, a tumor composed of malignant growths of both types, is even more rare. But three authentic cases can be found and each of these originated in the thyroid. Metastases were studied in only one, and here not only were some of the secondary growths of mixed type, but pure sarcomatous and pure carcinomatous secondary growths were also found. These facts may be of interest in considering the etiology and biology of malignant neoplasms, but they do not offer a direct explanation of any of the existing problems.

On Amyloid Metastasis. W. Burk. (*Centralb. f. all. Path. u. path. Anat.,* 1901, No. 16.)

The primary tumor was situated in the thyroid gland; it was as large as a fist, of a yellowish white color, transparent like horn, and of a cartilaginous consistency. Microscopically, it was seen to be made up of large homogeneous flakes, or lumps of amyloid, in lightly concentric layers. These were surrounded by little zones, of round celled tissue. Within the tumor the normal structure of thyroid had entirely disappeared.

Metastases of the same were found in the cervical lymph nodes, in the bronchial and submaxillary lymph glands, in the lungs, and in the pleuræ pulmonales on both sides; besides there was a solitary metastasis in the left cerebellar hemisphere. The author thinks this is the first case of its kind to be reported.

Four Cases of Carcinoma Occurring in Married Couples, with Contributions to the Statistics of Carcinoma. Rodenstock. (*Deutch med. Woch.*, May 29, 1902.)

In the first married couple, the wife had an ovarian carcinoma. The husband died several years later with intestinal carcinoma. In the second, the wife 70 years old, with a rapidly developing carcinoma of the esophagus. Three years later the husband, 77 years old, developed a cancer in the same place and died in two months. The statistics from the city of Chemnitz, 1890 to 1899, were as follows: From 1890 to 1892 there were 452 deaths from carcinoma; 49 of these or 10.84 per cent were in persons between 30 and 40 years of age. From 1894 to 1899 there were 846 deaths from carcinoma, of which 95 or 11.22 per cent were in persons between 30 and 40 years of age. Workers in iron developed early carcinoma more frequently than any others.

Oidiomycosis of the Skin and its Fungi. Ricketts. (*Journal of Medical Research*, Vol. VI., No. 3, Dec., 1901.)

This brochure constitutes an entire number of the journal. It embraces about 150 pages, a bibliography with about 150 references, and a series of plates.

The conclusions of the author are as follows:

1st. The so-called protozoic disease of Posadas, Wernicke, and others; Busse and Curtis' saccharomycosis hominis; and Gilchrist's blastomycetic dermatitis, are manifestations of the same disease.

2d. The condition in the skin possesses constant clinical and histologic characteristics which separate it positively from all other skin diseases, particularly verruca, tuberculosis, carcinoma and syphilis.

3d. The organisms isolated from various cases differ in minor respects among themselves, but are so closely related morphologically and biologically as to justify their inclusion under the common type Oidium. They are thus analogous in a pathogenetic sense to the fungi which cause actinomycosis, and to those causing trichophytosis.

4th. We recognize three morphologic types: 1. Blastomycetoid; 2, Oidium-like; 3, Hyphomycetoid.

5th. There are two histologic forms in the skin, the eosinophilous and the non-eosinophilous, the former being associated with the mould type of the organism.

6th. In accordance with conclusion 3, oidiomycosis is an appropriate term for the conditions caused by the organisms, and oidiomycosis cutis for the disease as it occurs in the skin.

7th. Aside from the infections considered in this communication, certain cases which have been described in the literature from time to time, indicate that oidium-like organisms may cause other severe pathologic conditions in man.

Histogenesis of Melanosarcoma of the Skin. Alfred Schalek. (*Trans. Chicago Path. Society,* Vol. IV., page 368.)

The author believes that the standpoint taken by Unna and his followers is correct, and that melanosarcomata of the skin do arise from pigmented epithelial cells of the epidermis. These cells proliferate into connective tissue and become entirely detached from the epidermis, still further proliferating after having been cut off. These cells lose their epithelial character and assume that of ordinary connective tissue elements and that of those particular pigmented cells known as chromatophores. L. Loeb has experimentally demonstrated that such a change may take place, when epithelia are implanted into connective tissue.

Molluscum Contagiosum. White and Roby. (*Jour. Med. Research,* April, 1902.)

The authors conclude that nobody has demonstrated any parasitic body in the growth and that the change is not

colloid or hyalin degeneration, but rather an extraordinary metamorphosis of rete cells into keratin.

Two Examples of Bence Jones Albumosuria Associated with Multiple Myeloma. L. P. Hamburger. (*Johns Hop. Bulletin,* Feb., 1901.)

The author made a diagnosis of sarcoma of bone on the strength of the urine analysis. The following were the characteristics on which the diagnosis was made. Quantity 3500 c.c., Sp. gr. 1004. Hellers test—a heavy ring. Heated to 55 C. it gave a heavy milk-white precipitate. When boiled it became clearer and when allowed to cool the turbidity returned. If acetic acid was added the precipitate disappeared. When a few drops of nitric acid was added it precipitated heavily, now boiled it cleared but again precipitated on cooling. Biuret reaction given. No casts.

A diagnosis of myeloma was made; a physical examination and a consideration of the clinical history confirmed the diagnosis.

A month later he saw a second case and this case later came to autopsy. The urine findings were essentially the same. Myelomata were found in the skull, left scapula, both clavicles, the sternum, right ilium and the neck of the right femur. The author considers two questions at some length. The first is the relation of albuminuria to albumosuria and the relation of the latter to bone tumors. He says that these urinary reactions are specific for myeloma but that they are not an accompaniment of every bone tumor. The second point that he dwells on is the nature of the myeloma. He rather leans to the idea of Wright, that the cell is related to the plasma cells. His bibliography contains 23 citations.

Cholesterin Crystal Giant Cells. LeCount. (*Trans. Chicago Path. Soc.,* Vol. V.)

The author calls especial attention to the article of Meyer (*Ziegler's Beitrage,* 1893, XIII.) He reports two cases, one an inflammatory mass from the testicle, the other a carcinoma of the head. The giant cells were large,

broad, flat and plate-like, certain clear areas were recognized as formerly the seat of some substance soluble in alcohol. The alcohol in which the specimens were kept was found to be rich in cholesterin.

Giant-celled tumors were produced by injecting cholesterin into guinea-pigs. (The giant cells contained cholesterin crystals.)

Absorption and Incrustation of Elastic Fibers in Giant Cells. Hektoen. (*Trans. Chicago Path. Soc.*, Vol. V., No. 4.)

He makes reference to the work of Rona (*Ziegler's Beitrage*, 1900, XXVII.) and reports two examinations. The first was a firm nodule at the anal margin. In this was a number of giant cells resembling foreign body giant-cells more than those of tuberculosis. Many of these giant-cells contained elastic fibers, some of these fibers were incrusted with lime salts and some with iron salts. The case was not proved tubercular.

The second specimen was from a bulbous nose. Within the giant-cells were elastic fibers incrusted by lime or iron and giving evidence of a progressive absorption.

The author concludes that giant-cells can form regardless of tubercular infection, that they can include elastic fibers and that possibly retrogressive changes in the contained fibers are hindered by the deposition of lime or iron salts.

Two Cases of Myoma Sarcomatodes. E. H. Eising. (*Jour. Path. and Bact.*, June, 1902.)

First Case: Small tumor size of a cherry found post mortem in wall of stomach, situated within muscularis. The mucosa not involved. On gross examination the tumor appears to be a simple fibromyoma. Microscopically it is made up of unstriped muscle cells sparsely interwoven with strands of connective tissue. It is non-vasculated. Normal muscle cells are seen pressed into the mucosa, but deeper the texture becomes coarser and cells with abnormal nuclei appear, some 3 to 5 times the normal size, others oval shaped. Some are to be found like spindle muscle fibers.

Here and there appears a nucleus contracted at the center with a cluster of granules at either pole. Others show two or more vacuoles arranged in the long axis of the cell. There are also round and spindle cells together with here and there a giant-cell of the polymorphonuclear type.

Second Case: Polypoid tumor of the esophagus, clinically a carcinoma. About the size of a walnut. Pedunculated and situated about 12 cm. above esophageal opening into stomach. Microscopic examination shows that on the upper part of tumor there is a layer of squamous epithelium, eroded in places and replaced by a necrotic membrane. Beneath this is a thin layer of coarsely arranged connective tissue into which the epithelium dips. The muscularis is much thickened forming the greater part of the tumor. Near the surface the muscle cells are normal, but deeper down are mixed with normal cells and very long cells having enlarged and irregular shaped nuclei.

In some places the nuclei are already divided while others show the karyokinetic process. Towards the deeper part of the specimen the connective tissue shows a circular arrangement enclosing masses of epithelial cells, presenting a well marked adeno-carcinoma. Several small cysts are seen, due to dilatation of newly formed gland ducts. One case was complicated by the presence of carcinoma.

Eising believes that the myoma sarcomatodes possesses a special degree of malignancy with a tendency toward the formation of metastases.

A Case of Multiple Myeloma. W. G. MacCallum. (*Jour. Experimental Med.*, Vol. VI., No. 1.)

The author records a case and bases a discussion of the biologic origin of these tumors on a study of the cells of this tumor. He concludes that in this case he has new growths from the bone marrow and not sharply outlined macroscopically or microscopically. The cells nearly resemble myelocytes; they do not have the protoplasm granules of myelocytes but have their nuclear structure. They do not resemble plasma cells, they are too large. They do

not stain with polychrome methylen blue as do plasma cells. He concludes that they are derived from the antecedent cells of the myelocytes.

This case was that of a senile woman with tumors in the marrow of the femur, clavicles, sternum and scapula and skull bones. There had been pathologic fractures in the sternum, right clavicle and the right femur. There was a marked secondary anemia with a few probable myelocytes in the peripheral blood. There was albuminuria. The bibliography includes fifteen references.

On the Classification of the Benign Thyroid Tumors. Pratt. (*Boston Med. and Surg. Jour.*, July 3, 1902.)

The author tabulates the following divisions of these tumors:

1—Simple adenoma.

Closed vessels filled with colloid, the character resembling the normal thyroid.

cystic goiter
colloid goiter
fibrous goiter
} Simple adenoma that has undergone secondary changes.

2—Fetal Adenoma.

The tumor resembles the fetal thyroid, contains solid masses or rosettes of epitheloid cells, but little or no colloid.

3—Papilliferous Adenoma.

Branching papillæ lie in the cystic spaces.

(a) Developing from the walls of old cysts.

(b) True adeno-cystoma. Resembling the adenocystoma of the ovary.

The first group constitutes 90 per cent of the thyroid tumors. He suggests that quite possibly a good many of groups 2 and 3 are malignant. Growths of the histologic structure of group 3 are usually malignant in other portions of the body.

The Changes Occurring in Striped Muscle in the Neigh-

borhood of Malignant Tumors. F. P. Anzinger. (*Am. Jour. Med. Sciences,* February, 1902.)

The author believes that the changes are not specific but are produced by conditions other than malignant tumors.

The changes produced in muscle by invading carcinoma are more marked than those produced by sarcoma, but do not differ essentially in kind. Those produced by sarcoma are chiefly mechanical; those produced by carcinoma are mechanical, nutritive and metabolic. Evidences of toxic action are more marked in the latter than in sarcoma.

Carcinoma acts more as an active, injurious foreign body upon muscle than does sarcoma.

On the Pathologic Formation of Corpus Luteum Tissue. Leo Leob. (*Trans. Chicago Path. Soc.,* Vol. IV., Page 252.)

This article treats of an ovary of a calf, which presented several unusual features. The author has not found a similarly described ovary in the literature. It was the ovary of a calf six months old. It had suffered from actinomycosis of the face and for that reason had been killed. The postmortem examination showed all the other parts free from actinomycosis. The ovary on one side was much enlarged. It was hard and elastic and the surface smooth. No follicles or corpora lutea were visible on the outside. The blood vessels were prominent. On section the connective tissue of the periphery was much developed, and scattered through the organ was tissue resembling corpus luteum tissue. The author believes that this proves that this new formation of tissue similar to corpus luteum tissue is not necessarily dependent upon the formation of the corpus luteum of pregnancy. Possibly this new formation is not even dependent upon the rupture of a follicle.

The microscopic findings speak in favor of the view that the lutein cells are derived from the connective tissue; the results could be reconciled only with the origin of lutein cells from granulosa cells by assuming that the granulosa cells penetrate diffusely into the connective tissue and then cannot be distinguished from connective tissue cells, or by

assuming, with Foulis and Wendeler, that the granulosa cells are connective cells, and that therefore the growth of granulosa cells might, under certain circumstances, produce connective tissue formations.

Chondrofibroma of the Uterus. Kworostonsky. (*Beitrage z. path. Anat. u. allg. Path.* Bd. 32 Heft 1, 1902.)

The author concludes that the cartilaginous osteoid tissue can be formed from the cellular and fibrous tissue of the uterine fibroma. The cartilage and bone elements retain the characteristics of the tissue that serves as a matrix. The bone is not produced from osteoid tissue but from cartilage or from connective tissue and shows no disposition to grow; contains no osteoblasts; no giant cells and no nuclear divisions.

He concludes that the part that is to serve as a matrix, first undergoes a retrograde metamorphosis consisting in hyaline swelling and mucous, fatty and granular degeneration. Cartilage does not tend to overgrow but does tend to liquefaction and some other retrograde processes. In fibromas the cartilage and bone are the results of retrogressive processes in the tissue.

In chondro-sarcoma while the cartilage is also growing there is no tendency towards limitless growth. Further, in such chondro-sarcoma or osteo-sarcoma the cartilage and bone are always histoid. There are no organized elements and it can spring from the tissue of the tumor proper, although the author admits that the same kind of tumor can develop from embryonic cartilage and bone elements. The bone and cartilage elements in fibroma have the same vessel system as the connective tissue from which they spring, although the vessels do not participate in the degenerative processes that anticipate the laying down of cartilage and bone.

Presence of New Elastic Fibers in Tumors. Alice Hamilton. (*Trans. Chicago Path. Soc.,* Vol. IV.)

In hyperplastic connective tissue, there is in almost all cases, a proliferation of elastic fibers. This proliferation is always compensatory in character, either to make up

for a loss of elasticity in the organ, or to increase its normal elasticity. When there is no need for elasticity, the new tissue consists of simply the white fibrous variety.

They are found in tumor masses, where there is no question but that it is a newly formed stroma.

They are found in numbers far greater than those normally present in the organ affected. They are found in scattered masses, not in connection with vessels or ducts, although normally the organ in question contains elastic fibers only around the excretory ducts and blood vessels.

Iron in Cancer Cells. Schwalbe. (*Centralblatt f. allg. Path. u. path. Anat.,* 1901, No. 21.)

The writer, as the result of study of cancer cells from the liver, concludes that the cancer cells have the property of elaborating iron. He found iron in the cells and decided that it had not been taken up; he found more in growing carcinoma than in carcinoma that was degenerating. The iron was shown by the Berliner Blue reaction. The carcinomata were metastatic and he thought their iron properties were acquired from their environment.

The Pathology of the Tissue Changes Caused by the Roentgen Rays, with Special Reference to the Treatment of Malignant Growths. Carl Beck of New York. (*N. Y. Med. Journal,* May 24, 1902.)

The author has made a thorough study of the subject and gives the following conclusions:

1. The first degree is characterized by the symptoms of hyperemia, the cutis being infiltrated and the temperature somewhat higher. Exfoliation takes place in small scales and the most pronounced subjective sign is the tormenting itch in the skin. It seems that there is atrophy of the glands, hair and nails.

2. The main feature of the second degree consists in the formation of blisters, the clear or yellowish contents of which lift the corneous from the mucous stratum of the rete Malphighi. The inflammatory signs are well marked, the tension considerable and the pain intense accordingly.

After the removal of the blisters the corium is exposed as a red and sore surface.

3. The third and gravest degree is characterized by the escharotic destruction of the indurated tissues. It shows the signs of dry gangrene.

The most characteristic difference between ordinary burns and the integumental changes produced by the Röntgen rays is the fact that the latter do not manifest themselves before the lapse of a period of incubation, as a rule about two weeks.

Examination of the integumental changes in men as well as in lower animals shows a disturbance of nutrition in the walls of the blood vessels, just as in ordinary burns, the main difference consisting in the slower development of the process.

A Review of the Recent Literature on Certain Infectious Diseases. A. O. J. Kelly. (*Am. Jour. Med. Sciences,* Feb., 1902.)

It is not possible to abstract this paper, which is in itself abstracts, but the editor wishes to call attention to this consideration of the recent literature on this very important subject.

A Study of the Bacteriology and Pathology of 220 Fatal Cases of Diphtheria. Councilman, Mallory and Pearce. Published by donation from Dr. H. F. Sears.

This most exhaustive study embraces 175 pages of text, a bibliography with nearly 200 references, and seventeen plates. The literature is critically considered. There is much of statistical study but the bulk of their effort has been directed towards the histology of each organ in diphtheria.

Of the mixed infections, 34 were with scarlet-fever. Sometimes the manifestations were simultaneous, but usually one followed the other. There were no marked differences between the remote lesions of the simple and of the mixed infections.

In 153 cases of diphtheria without secondary infection, the specific bacillus was found, in the heart's blood 7 times,

liver 30 times. In 56 cases of diphtheria associated with measles or scarlet fever the specific bacillus was found in: heart's blood 6 times; liver 15 times; spleen 8 times; kidney 16 times. In addition they report the frequent finding of streptococcus, staphylococcus and pneumococcus. There follows a statistical study of the lesions associated with the specific pharyngitis.

In studying the membrane they found great variance in its presence (57 per cent present), in its location and its structure. Histologically the membranes were of several characters. The toughest were composed in great part of fibrin which had undergone some hyaline changes and stained quite differently from fibrin, also epithelial cells and leucocytes showing hyaline degeneration and coagulation.

The second and more friable kind rarely showed fibrin which stained characteristically by fibrin-staining methods and showed but occasional areas of hyaline transformation. There was variation in the histology of the membrane in different localities. Usually the exudate seemed to well up and flow over the surface and then coagulate. Bacilli were never found in living tissue. They think it probable that the beginning of the process is a necrosis of the local tissue due to toxins from bacilli growing in the glands of the mouth, giving to the bacillus properties quite saprophytic. The necrosed cells furnish the coagulating stimulus to the exuding plasma.

In the heart the principal lesion is degeneration of the myocardium. This may proceed through fatty changes or may go by way of one of the hyaline routes. They found two varieties of acute interstitial myocarditis. Thrombus was occasional.

As to the lungs their statement is, "There is no organ of the body in which lesions accompanying diphtheritic infection are so generally found or so serious as in the lungs." The most common lesion was broncho-pneumonia. More than anywhere else the lungs showed variations in the character of the pathologic processes that may follow the

same bacillus. Pneumococci, streptococci and diphtheria bacilli were found in connection with serous, purulent, fibrinous and hemorrhagic exudations, necrosis and abscess formations. Pneumococcus was the usual pathogenic agent.

Diphtheria bacilli were frequently found in the spleen. About the only change found prominently in the spleen in diphtheria and not found in other infectious diseases, is, marked hyaline degeneration of the vessel-walls.

The lesions of the alimentary canal are unimportant.

The lesions of the liver are the parenchymatous degenerations and focal necroses common to the acute infectious diseases.

The lesions of the kidney have already been alluded to. They are essentially those of the infectious diseases.

The lesions of the lymph nodes belonged to two groups. The first are the ordinary lesions of lymphadenitis. The second those peculiar to diphtheria. These consist of focal necrosis. There is primarily a proliferation of epithelioid cells. These devour the lymphoid cells and die. There is some leucocytic infiltration. Caseation was never seen. Giant cells were never found. No bacteria were found in the necrotic zones. The necrosis was due to toxins.

The report includes reports on the thymus, nervous system, skeletal muscles, bone-marrow, pancreas, adrenals, thyroid-gland, salivary glands, testicles and pituitary body.

Notes on the Intracellular Occurrence of the Diplococcus Pneumoniae in Cerebro-Spinal Meningitis. Wilson. (*Jour. Am. Med. Assoc.,* Dec. 31, 1901.)

In view of the fact that the occurrence of Weichselbaum's coccus within the cells and of the pneumococcus without the cells is about the only point of differentiation between the two that is not disputed at the present time, the author has thought it wise to record these 4 cases in which the organisms after careful study were classed as pneumococcus and yet were usually found within the cells.

The patients were two children and two horses. One of the children and both of the horses came to autopsy. An-

other horse and six rabbits were inoculated with the material obtained. The author thinks that in certain cases the shape, staining and culture reaction of the germ may be of more service than its position as regards the cell.

Sporothrix Schenckii. Alexander Foulerton. (*British Med. Jour.,* April 20, 1901.)

The above organism belongs to the pathogenic mould fungi, and has been isolated by Schenck and Hektoen from cases of abscesses following a lymphangitis.

Animals inoculated from cultures developed typical lesions, both at point of inoculation and in some of the internal organs. Oval spores are found both in the cultures and in the tissues where lesions are found. The lesions have, at first, the appearance of an ordinary granuloma, which later undergoes caseation, or breaks down into a purulent fluid.

Ulcero-Membranous Amygdalitis Due to Bacillus Fusiformis. Raoult. (*Le Progrès Médical,* July 6, 1901.)

The author in connection with G. Thiry reports 5 cases of ulcero-membranous amygdalitis due to bacillus fusiformis. This makes nine cases seen by Thiry. The bacillus is frequently associated with the spirillum of Vincent.

The Bacillus Fusiformis of the Mouth as a Cause of Angina. Vincent (*Gaz. des Hopitaux,* Feb., 1901.)

The author believes that this bacillus is widely spread, having found it in the mouths of 22 out of 27 healthy subjects. He found it in anginas with false membranes. He believes that it can produce peridental and peribuccal abscess.

Correspondence between Cholera and the Prevalence of Comma Bacteria in Well Waters of Jujerat During the Famine of 1900. George Lamb. (*London Lancet,* April 20, 1901.)

Comma bacteria were found in a large number of waters, but it is probable that only a small proportion of these organisms were real cholera-producing bacteria.

Epidemic of Pest in Beyrouth. Brun. (*Gaz. des Hopitaux,* Jan. 29, 1901.)

The author argues that pest is not contagious. This, he says, is true of the bubonic form. The pulmonary form is, he thinks, very contagious. He cites 4 cases treated with Yersin serum. All cured. The dose is 20 to 40 c.c. The earlier it is used the better.

The Pathology of Bubonic Plague. Flexner. (*Am. Jour. Med. Sciences,* Oct., 1901.)

The author agrees with the findings of the German Commission that the pest bacillus secures entrance to the body through two main routes, (1) lesions in the skin; (2) the lungs. And also that the type of the disease and its virulence is dependent upon the route of infection.

In the bubo form there is swelling of the lymph-glands with hemorrhagic necrosis and glandular suppuration. These processes invade the tissue surrounding the gland secondarily. There is produced a fatty degeneration of the heart, liver and kidneys. Splenic tumor is constant; the pulp is distended with blood cells and contains many polymorphonuclear cells. The follicles are but little altered. The endothelial cells of the pulp proliferate and desquamate.

There is a pyemic form with multiple abscesses. In the pneumonic form there is usually a lobular pneumonia, though occasionally it is lobar.

Statistics Regarding the Effect of Inoculation Against Typhoid Fever in South Africa. Alexander Crombie. (*London Lancet,* May 3, 1902.)

The author is evidently of the opinion that these statistics demonstrate that there is some preventive power in inoculation against typhoid fever. His observation bore on 250 officers and men returned from South Africa. Inoculations had been made on the way out and therefore about 10 days before the men became subjected to the dangers of camp life.

To the Editor it does not seem that the figures show any protective capacity on the part of the preventive inoculation. certainly not four months after the inoculation.

An Experimental Investigation of Puerperal Pyemia.

F. G. Gaertner. (*Am. Jour. Med. Sciences,* March, 1902.)

The author, after experimenting on eighteen animals, comes to the following conclusion:

It did not make any difference whether staphylococci or streptococci alone, or both together, were used for infection of our artificial cotton-wick thrombi; the insertion of the same in the external jugular vein of eighteen animals, uniformly caused pyemia, with its characteristic symptoms—phlebitis, suppuration in the surrounding tissues, embolic abscesses in sub-maxillaries, parotitis, cerebrum, and general blood poisoning and death of animals.

The intensity of the pyemic infection depended: First, upon the origin of the employed cocci (staphylococci from carbuncle pus, and streptococci from erysipelas, proved the most poisonous, no matter how many cultivation passages they had experienced). Second, upon the time elapsing between the making of the cotton-wicked thrombi and their insertion (the longer staphylococci and streptococci were kept in a dry state, the greater was the loss of virulence, no matter how virulent the cocci proved at their first examination).

Cancer and Malaria. (Editorial in the *Therapeutic Monthly,* March, 1902.)

The author discusses the theory of Loeffler that there is antagonism between cancer and malaria, using as a basis for his discussion articles by Krause, Davison, Spitzly and Prochnik. The conclusion reached is that there is no antagonism. The facts tending to show that it is are easily explained on other bases.

Two Different Ways in which Yellow Fever May be Transmitted by the Culex Mosquito—Stegomyia Taeniata. Charles J. Finlay. (*Jour. Am. Med. Assoc.,* Nov. 23, 1901.)

After a general review of the whole subject the author says: "From these considerations it must be inferred that the bite of a yellow fever mosquito which has sucked the blood of a severe case is likely to prove infectious for non-immunes at two separate periods, namely; during the

first few days after the insect has bitten the patient, provided that in the meantime the mosquito has not had access to any food or water, nor been allowed to bite another subject; and 10 or 15 days later, when the germs within the body of the insect will have had time to multiply and to invade its salivary apparatus.

"The direct infection through the bite of recently contaminated mosquitoes, so far as I can judge from personal experience, produces much milder pathogenic effects. The fever is much less prone to develop albuminuria, and the period of incubation is often prolonged. I believe that after this mode of infection has been duly verified, and with certain improvements, including the employment of home-bred mosquitoes and the proper adjustment of the number of these necessary to secure visible pathogenic effects, it will be found to constitute the only method which may be safely used, upon a large scale for the purpose of conferring immunity."

Bionomics. Experimental Investigation with Bacillus Sanarelli and Experimental Investigations with Malaria in Connection with the Mosquitoes of New Orleans. G. E. Beyer, O. L. Pothier, M. Couret and I. J. Leman. (*New Orleans Med. and Surg. Jour.*, Jan., 1902.)

Stegomyia fasciata is a cistern breeder, found in the water of 128 out of 210 cisterns. It was also found in the water of 16 out of 21 gutters. In the more densely settled parts of New Orleans it was found in only 10 per cent of the gutters. This mosquito is far more troublesome during the day than at night. They agree that anopheles is a swamp mosquito and it grows only in water rich in organic matter. Overflows are very destructive to it. It will not live in cisterns. They believe that tertian and quartan malaria is transported by anopheles maculipennis but that estivo-autumnal malaria is spread by anopheles crucians. It is also a swamp breeder but gets into cisterns more frequently than anopheles maculipennis. Anopheles is a night feeder and when stirred up will bite in the day time. Unlike most mosquitoes when it bites it holds on. The most

striking peculiarity is their resting position, that is, with the head nearer the wall than is the body.

In the way of treatment of cisterns they recommend covering with very finely meshed screens. Gutters should be flushed and treated with oil. Swamps should be drained or treated with oil, or both.

The second part of the treatise deals with bacillus icteroides of Sanarelli. They attempted to inoculate animals with this bacillus using stegomyia as an agent. They conclude that the disease produced in animals has the lesions characteristic of yellow fever. That the bacillus is kin to B. typhosus. That the bacillus cannot live long when associated with B. coli, either within or without the body. That stegomyia conveys the bacillus but that it cannot convey it from a dead body.

Section third deals with the subject of malaria and the relation of anopheles thereto. The conclusions arrived at, have already been noted.

Section four is a resumé of conclusions with suggestions for practical application of those conclusions to the conditions that exist in New Orleans.

Malaria Parasitology. James Ewing. (*Jour. Experimental Medicine,* Vol. V., p. 403.)

This is one of the most complete studies of the biology of malarial parasites of which we know; albeit the Editors do not entirely agree with some of the ideas advanced.

Under technic, the author uses fresh blood, if the organisms are abundant; dry specimens, if the organisms are few. He stains first, with eosin and methylen blue for ordinary preparations; second, with Koch's method, if the organism fails to show young ring forms; third, Gage's hematoxylin before using No. 1.

The author critically studies the finer structure of the different varieties of malarial parasites and the changes in these structures in the different stages of the life history of each parasite.

He concludes that while there is considerable variation in the details and character of the different micro-organ-

isms and under circumstances there is a fixed type for each; at the same time it is probable that the different types can be modified by environment and even merged into each other.

The Differentiation of the Five Genera of North American Mosquitoes, with Especial Reference to Anopheles. H. F. Cassidy and Francis Carey Boyne. (*American Medicine,* May, 1902.)

The authors give technical descriptions of the mosquitoes around Buffalo. These technical points we will not quote.

They do not believe that the classification of Howard is quite comprehensive enough for our present information concerning mosquitoes. They have found anopheles to be a country mosquito, but they have found it in clear running water as well as that which was stagnant. It was, however, usually found in quiet, moss-grown spots in the running streams. Freezing for one hour or more, or perhaps 10 hours did not hurt the larvæ.

A Parasite of the Common Night Mosquito. Henry B. Orr. (*New Orleans Med. and Surg. Jour.,* Dec., 1901.)

The author examined the bodies of the common night mosquito and found four forms of parasite or four forms of the same parasite. These parasites were capable of living, for a short time at least, in digestive juices, in blood and in rain-water. He believes this parasite not to be the cause of any recognized human disease.

Malaria and Anopheles in New England. Jordan. (*Trans. Chicago Path. Soc.,* Vol. V., No. 2.)

The author records his search for anopheles. They were found in and near the towns of Gorham and Shelburn, New Hampshire, and Gilead, Maine. He found anopheles punctipennis and maculipennis. They were to Culex as 1 to 20. They were found only in waters rich in nitrates. These feed on algæ and anopheles being surface feeders need such pabulum.

Anopheles and Malaria. Billet. (*Comtes rend de l' Academie des Sciences,* 1901.)

Observations at Constantinople. Culex first mosquitoes to appear, no malaria. Toward middle of June anopheles were found, malaria appeared.

A New Sporozoan Parasite of Anopheles. H. P. Johnson. (*Jour. Med. Research,* March, 1902.)

In this article the writer describes a parasite found in 80 per cent of anopheles maculipennis that he examined in Massachusetts. He refers to its resemblance to malaria and suggests it as a source of error. The article contains features to which we refer our readers.

Malarial Fever in Infancy, Probably Maternal in Origin. Lindsay Peters. (*Johns Hopkins Hosp. Bulletin,* June, 1902.)

The author reports some cases in which it would appear the infection had been carried from mother to child. He believes that it is highly probable, that, in the majority of cases in which the infection is transmitted from mother to fetus (assuming that such does take place), the contamination of the child's blood does not occur until labor has begun, when the separation of the placenta affords an opportunity for the mingling of fetal and maternal blood.

Mixed Infections of Typhoid Fever and Malaria. Fiocca. (*Il Policlinico,* 1901.)

This is the report of a case in which there was malarial infection followed by typhoid with a return of the malaria after the fever. It would seem probable that there was one malarial infection serving for the two attacks and that the malaria was in abeyance during the course of the typhoid.

There is nothing unusual about it except that the malarial organisms were found microscopically and the Widal reaction was given.

A Preliminary Report of the Transmission of Pathogenic Germs by the Common House-fly. Jacolyn Manning. (*Jour. Am. Med. Assoc.,* May 17, 1902.)

Forty-four culture tubes were subjected to fly-infection; of this number 41 showed colonization at the end of 48 hours, 3 tubes remained apparently sterile.

The following germs have been transmitted by fly-infection, isolated and pure cultures obtained: (1) Pathogenic germs—bacillus pyocyaneus—staphylococcus pyogenes aureus—bacillus typhus abdominalis—bacillus coli communis. (2) Non-pathogenic—bacillus prodigiosus—sarcinæ alba, molds and fungi.

Placental Transmission, with Report of Case During Typhoid Fever. Lynch. (*Johns Hopkins Reports,* Vol. X., Nos. 3, 4 and 5.)

In the first case the mother showed typhoid bacilli in the urine, in the uterine discharge (second attempt), but none in the blood (three attempts). Widal positive. The placenta did not show typhoid bacilli. The child's blood did not give Widal. The organs of the child contained typhoid bacilli.

In the second case the mother's blood gave Widal reaction. The blood of the child did not give Widal. The child's organs, examined forty-two hours after death, did not give typhoid bacilli. The placenta was negative as to typhoid bacilli. The examination was not as satisfactory or complete as in the first case.

The third case was examined only as to Widal. The blood of the child was negative.

The author concludes that typhoid bacilli may pass from mother to child; that placental transmission is not the rule; that Widal is not always given by the blood of the child; that when it is given we cannot be positive where the agglutinating substance has come from. The bibliography has 144 references.

Dengue. A Study of Its Mode of Propagation and Pathology. Harris Graham. (*Medical Record,* Feb. 8, 1902.)

The author from a series of experiments he has conducted and from many observations has concluded that the disease is transmitted only by the mosquito and then by a member of the culex variety. From studying the blood of infected patients he has discovered an organism resembling somewhat the malaria parasite, but having a much longer

period of development. Inoculated cases are affected within from 4 to 6 days.

Some Unusual Localizations of Tuberculosis. F. A. Baldwin. (*Medical News,* Dec. 7, 1901.)

The author cites as unusual localities for tuberculosis that of the hypophysis, intercostal tissue near sternum, primary attack of the Fallopian tube, thyroid gland, uvula and an adenomatous polyp of the cervix uteri.

A Case of Tuberculosis of the Skin Following Accidental Inoculation with Bovine Tubercle Bacillus. P. Ravenel. (*Univ. of Penn. Med. Bulletin,* Vol. XIV., March, 1901, to Feb., 1902.)

This case is reported to show the following notable features: The rapidity of the growth of the nodule, indicating marked virulence of the infecting organism, and the large number of giant cells and tubercle bacilli seen in the sections. Such cases do not settle the entire question of the transmissibility of bovine tuberculosis to man, but they prove most conclusively that the bovine bacillus finds soil and conditions in the tissues of man suitable for its multiplication, and that it produces in man its typical effects, notwithstanding the well-established fact that the skin is by no means a favorable tissue for its development.

The Intercommunicability of Human and Bovine Tuberculosis. Ravenel. (*Medicine,* July and August, 1902.)

After a very thorough and able discussion of the relation existing between tuberculosis, as affecting man, and the probable source and mode of infection, based upon the statistics of many different investigators, as well as upon his own work, the author reaches the following conclusions:

"The evidence at hand forces us to conclude that human and bovine tuberculosis are but slightly different manifestations of one and the same disease, and that they are intercommunicable. Bovine tuberculosis is, therefore, a menace to human health. We are not in a position at present to define positively the extent of this danger, but that it really exists cannot be denied. In the past there has probably been a tendency to exaggeration; however great this may

have been, it does not now justify any attempt at belittling the risk, and it is folly to bind ourselves to it. The eradication of bovine tuberculosis is amply justifiable from a purely economical standpoint; viewed in its bearing on human health it becomes a public duty."

The Relationship Between Human and Bovine Tuberculosis. J. G. Adami. (*Philadelphia Med. Jour.*, Feb. 22, 1902.)

The author has drawn the following conclusions:

1. Bovine tuberculosis is easily conveyed from cattle to cattle, most commonly by inhalation.

2. Human tuberculosis is transmissible to cattle.

3. Swine appear to be fairly easily infected with both human and bovine tuberculosis.

4. Human tuberculosis in the majority of cases is conveyed from human being to human being by inhalation, more rarely through the alimentary tract, through surface wounds and from mother to fetus during intrauterine life.

5. Everything points to the fact, that in the main the bacilli causing the infection in man are derived from previous cases of the disease in man.

6. By sojourn in the human body and passage from man to man the human tubercle bacilli have acquired properties differing from those acquired by bacilli which have passed through cattle; their shape differs; the rate of growth and the appearance of the growths outside the body are different; their virulence towards the animals of the laboratory is also different.

7. Bovine tuberculosis can be transmitted to man and this either through wounds or through the digestive tract.

8. By passage through cattle the tubercle bacilli gains increased virulence for cattle, rabbits and guinea-pigs, but lessened virulence for man and also (it would seem) for carnivorous animals.

9. Save in the very rare cases of wound infection, there is a significant lack of evidence that bovine tubercle bacilli infect adult humans.

10. Children affected by bovine tuberculosis are usually affected through the agency of milk.

11. Milk that is infective to humans is obtained only from cases of udder tuberculosis and contains the bacilli in large numbers.

The Relation Between Bovine and Human Tuberculosis. Theabold Smith. (*Medical News,* Feb. 22, 1902.)

The author believes that there is no evidence to show that bovine tubercle bacilli may indiscriminately infect the human subject. There is some evidence that bovine bacilli have been isolated from human beings, that the successful transfer is uncommon and that it depends on certain conditions which need careful clinical and pathologic study. The evidence that such transmission takes place must be based on the isolation of tubercle bacilli having the characters of the bovine variety.

Remarks on the Relations of Human and Bovine Tuberculosis. C. H. Cattle. (*British Med. Jour.,* Feb. 22, 1902.)

The author has observed that the bacilli found in these cases are extremely alike both in their form, their staining reactions and their mode of growth under artificial cultivation. That these bacilli, whether of bovine or human origin, produce typical tuberculosis when injected into rabbits or guinea-pigs. That tuberculin prepared from human tubercle bacilli produces a characteristic reaction when injected into tuberculous cattle just as it does when injected into tuberculous man.

It is generally admitted that cattle, swine and fowls can be inoculated with tuberculous sputum from man. Humans can be inoculated by bovine tuberculosis, this taking place chiefly through the milk of the infected animal, but only when the udder of the cow is infected. Primary infection takes place far more often by the respiratory than by the alimentary passages. Ingestion only succeeds in giving tuberculosis when the ingested material is very rich in bacilli.

The author believes that in children, as in adults, tuber-

culosis is mainly carried by infection derived directly or indirectly from a person affected by the disease.

Cells with Eosinophilic Granulations in Normal and Pathologic Tissues. Howard and Perkins. (*Johns Hopkins Reports,* 1902, Vol. X., Nos. 3, 4 and 5.)

The authors believe that eosinophile cells are derived from hyaline cells, from plasma cells, and perhaps from other sources; for example, muscle cells. They can develop in the blood or in the tissues. They were found in most of the normal organs, and in a great variety of pathologic processes. They were never acting as phagocytes.

The Role of the Mast Cells in Acute and Chronic Infection. Williams. (*Jour. Am. Med. Assoc.,* Dec. 14, 1901.)

Conclusions: "It appears from the preceding that evidence is at present lacking to prove that mast cells have any special relation to infections in general, or to any particular infection. But it must be said that the subject has not yet received the study that it deserves."

"This opens up a promising field for research."

Researches on the Structure of the Various Human Granulation Tissues. Reinbach. (*Ziegler's Beitrage Zur path. Anat.,* Bd. 30 Heft 1, 1901.)

The author in comparing healthy and unhealthy granulations says that healthy granulations always show fibrous cords on the surfaces; columns of fibroblasts and different kinds of leucocytes. In unhealthy granulations he finds fibroblasts in small numbers, leucocytes abundant. Mitoses are more abundant in unhealthy granulations but there is more extensive destruction of the cells.

The Role of Endothelium in Inflammation. E. R. LeCount. (*Jour. Am. Med. Assoc.,* Dec. 7, 1901.)

The author states that it is the generally accepted view that endothelial cells may assume certain embryonal properties in inflammation and assist in the formation of granulation tissue.

That they possess the power of absorbing non-motile bacteria and thus act as phagocytes. They alter in shape, and the nucleus as well as the cell body becomes larger.

When the endothelial cells of serous membranes do not suffer necrosis they undergo a lively proliferation. It is generally agreed that the lining of the serous cavities, pleura, peritoneum and tunica vaginalis, is allied to epithelium.

The Frequency of Trichinosis in the United States. (*Jour. of Med. Research,* 1901.)

The author examined 505 bodies of subjects dying of miscellaneous diseases, for trichinæ. He found this parasite in the muscle in 27 cases or 5.3 per cent.

On the Presence of Mononuclear Cells in Gonorrheal Urethral Secretion. Pappinheim. (*Virchow's Archives,* 1901, Bd. 164.)

The author concludes that the mononuclear basophilic elements in gonorrheal pus are histogenetic derivations as Marsetan says, but he does not exclude the possibility of emigration. In favor of their local derivation, he argues:

1st. The older the process, the greater relative abundance of these cells.

2nd. The presence of large lymphocytes.

3rd. Janowski's observation as to their presence in the periphery of abscesses.

The author believes that the basophilic cells are produced locally in both the acute and chronic stages, but that it is more pronounced in the later, than in the earlier stages. He says that in acute gonorrhea there are many gonococci and polymorphonuclear eosinophiles, and few lymphocytes. In chronic gonorrhea there are few gonococci, but a great relative abundance of mononuclears.

The Degenerative Changes in Pleuritic Exudates. Wolff. (*Berliner klin. Woch.,* Nov. 11, 1901.)

The author addresses his inquiry to the view that fatty inclusions in cells and glycogen, are due to progressive and not retrogressive tissue changes. He says that osmium stains only the olein, palmatin and stearin in the fresh state, are not stained by it. Sudan and scarlet "R" are more valuable for some purposes.

He concludes that fat in the cells is a degeneration phe-

nomenon; that glycogen inclusion is also a degeneration phenomenon; that there is some seeming antagonism between the processes.

On Certain Conditions that can Render the Milk Toxic or Dangerous. M. P. Leblanc. (*Bulletin de Lyon médical,* April 14, 1901.)

The author quotes Michellazzi's observations, showing that the milk from tubercular cows is in some measure toxic even when no bacilli are present. He cites illustrations of cases in which the milk of cows was toxic, producing diarrheas and malaise without being infected, the cow being heated or unhealthy from one of several other causes. He says that in all cases where there is any lesion of the milk ducts, the milk is infected. Even when the ducts are healthy the milk is usually infected.

In 24 observations on the healthy udder of cows he found infection of the milk 18 times. The infecting bacteria were nearly always staphylococci; colon bacilli were present once. Three out of four mares' breasts were found infected.

Effects of Direct, Alternating and Tesla Currents, also X-Rays on Bacteria. F. Robert Zeit. (*Jour. Am. Med Assoc.,* Nov. 30, 1901.)

The author has studied the results of continuous currents, alternating currents, Tesla currents, and Röntgen rays.

His conclusion was that so far as any practical application was concerned none of these had any bactericidal action.

The feeble bactericidal restraining power that was developed was due to such secondary influences as osmosis, liberation of acids or alkalies, or heat.

There certainly was no more toxic action manifested by the various forms of electricity and exerted upon the bacterial cells than would be exerted upon the cells of the host.

Poisoning with Metals. Heinrich Emden. (*Deutsch. med. Woch.,* Nov. 14, 1901.)

This is a report of the symptoms noticed in 1837 workers in manganese. The poisoning occurred by inhalation. The symptoms simulate those of mercury, lead and arsenic. Edema of the lower extremities, weakness in the small of the back and legs with a tendency to fall backward on attempting complicated movements. Disturbances of speech and voice appeared. In some cases it simulated multiple sclerosis with intention tremor, but without nystagmus.

Over-Excitement as a Cause of Auto-Intoxication. Poehl. (*Deutsch. med. Woch.,* Nov. 14, 1901.)

After analyzing the urines of persons who had been exposed to psychic, sexual and physical excesses, the author comes to the conclusion that over fatigue is an intoxication. In his opinion lactic acid is the agent.

Stigmata of Degeneration. Mayet. (*Gazette des Hopitaux,* Jan. 12, 1901.)

Mayet quotes Fere (*Gazette des Hospitaux,* 1901, page 9) as having found deformity of spinal column in 20 per cent of epileptics.

Heredity and Environment. Editorial. (*Medical News,* Feb. 15, 1902.)

"Heredity is an initial velocity," but many modifying forces are at work and life is the resultant of all the forces.

"Heredity is a prophecy of what may be, not a destiny which must be." There are always in the subject's own hands and especially in those of the guardians of the very early years, possibilities of guidance in development that may offset or greatly aid hereditary influences. This is especially true of the intrauterine life. In a word we are not the creatures of mere circumstances, but the resultants of many factors that may, under favorable conditions, always be made to bring out the tendency to true evolution rather than degeneration.

Enumeration of Blood Platelets; Their Relation, and that of the Leucocytes, to Blood-Coagulation. G. T. Kemp and H. Calhoun. (*British Medical Jour.,* Nov. 23, 1901.)

The skin was pricked through a drop of fluid that fixed

the blood platelets immediately and their number determined by their ratio to the red corpuscles. The most satisfactory fixative was 2½ per cent formaldehyde in 1 per cent sodium chlorid, tinged either with methyl violet or methyl green.

In normal blood the number of platelets per c. cm. taken from a mean of 75 observations was found to be 778,000. In dogs the mean was 381,000. The number has no definite relation to the leucocytes; but the ratio to the number of red cells was fairly constant.

Fibrin was removed by "fractional defibrination." At various stages, the red corpuscles, the leucocytes and the platelets were counted. The platelets disappeared progressively with each defibrination and after the blood ceased to be coagulable they were no longer present. The leucocytes disappeared to some extent, but never completely.

Mononuclear and polynuclear leucocytes were found at all stages and also after complete defibrination. The red corpuscles suffered some diminution but much less than the leucocytes.

In regeneration the leucocytes returned to the normal first, the red corpuscles next and the platelets last.

The authors agree that the platelets are independent elements and are not derived from the other elements. They were the only elements whose disintegration was to be seen in the coagulation of normal blood.

SPECIAL PATHOLOGY.

RESPIRATORY.

A Case of Genuine Third Lung. Herxheimer. (*Centralb. f. all. Path. u. path. Anat.*, 1901, No. 13.)

This is a report of an aberrant lung, with a separate bronchus. It was at the apex of the right thorax, internal to the apex of the right lung. It had a connective tissue covering. Microscopic sections showed that it had functioned,

until the oncoming of the terminal pneumonia. This pneumonia had solidified it.

On a Cyst Originating from the Ductus Thyro-glossus. G. C. Robinson. (*Johns Hopkins Bulletin,* Vol. XIII., No. 133, April, 1902.)

This was a cyst lined with ciliated epithelium and situated in the median line on a level with the hyoid bone. It was connected neither with the skin nor with the trachea.

Study of a Congenital Fistula of the Neck. Auche et Chavannaz. (*Jour. de Médecine de Bordeaux.*)

This is a report of a cyst of the neck beginning just behind the posterior pillar of the fauces and extending to the skin, on a level with the thyroid cartilage and 1 cm. outside of the anterior border of the sternomastoid muscle.

Its peculiarities were: It passed within the carotid investments and not between the carotids; it was lined with ciliated epithelium throughout; the presence of lymph follicles in the walls.

Multiple Ossified Ecchondrosis and Exostosis of the Trachea and Bronchi. I. B. Diamond. (*Trans. Chicago Path. Society,* Vol. IV.)

The author reports a case and states that this is a very rare affection, and there is much discussion as to whether to classify it as inflammatory or under the true tumors. Few observers have found any connection between the new growths and the tracheal cartilages. By some it is thought that trauma may play a part in their causation.

Nearly all the cases have died of some pulmonary affection as tuberculosis, abscess or gangrene of the lungs. Whether the growths are secondary or not the author is unable to say.

Study of the Pulmonary Scleroses of Parasitic Origin. G. Arthrand. (*Le Progrès Médical,* July 26, 1901.)

The author concludes that 25 per cent of the people who die in hospitals, die of tuberculosis. Seventy-five per cent show the apical nodules that Laennec says are tubercular. Therefore 50 per cent of the people have healed tubercle. He concludes that these indurated sum-

mits however localized are always symptomatic of an extended pulmonary sclerosis of the same nature and the same origin.

He divides them into 3 types:

1. Most marked, but rarest. Massive sclerosis. Extensive scars of cartilaginous consistency affecting nearly a whole lung. Fibrous phthisis.

2. Most frequent. Cicatrix at summit; pleuritic adhesions; lung generally atrophied and retracted, with a slight degree of emphysema especially at the base.

3. Nearly as rare as No. 1. Early general emphysema, with predominance toward base and very irregular and uneven spreading to apex, with nodules of Laennec, but generally without pleural adhesions.

The Increase of Elastic Tissue in the Lungs in Chronic Passive Congestion. Pearce. (*Journal Med. Research,* July, 1901.)

The methods pursued by the author were as follows: Hardening in Zenker's fluid, in alcohol or in other fluids. Staining by Weigert's method (*Centralblatt für all. Path. u. path. Anat.,* 1898, p. 289), and as a contrast, lithium carmine, Van Giesen, Saffarin and Anilin Oil Saffarin. For staining collagenous connective tissue, Mallory's triple stain was used (*Jour. Experimental Medicine,* May, 1900). Sometimes Van Giesen was used.

He concludes that in chronic passive congestion the increase in density of the lungs is due to the newly formed elastic tissue. This tissue is found increased in all cases of the disease. The increase is progressive and indicates an effort to strengthen the walls of the air passages, support the over-filled capillaries and prevent the collapse of the air-cells. It begins, not around the blood vessels, but around the air ways and spreads to all the structures of the lung and pleura. It is proportionate to the amount of hemosiderin but is not dependent on it.

Report of a Case of Fibrinous Bronchitis with a Review of All Cases in the Literature. M. Bettman. (*Am. Jour. Med. Sciences,* Feb., 1902.)

The author reports a case which does not differ from the usual history of the cases of this disease which show a rise of temperature. The casts were studied with various stains.

Weigert's showed a comparatively small number of fibrin filaments, streptococcus, staphylococcus and bodies to be referred to under Ziehl-Nielsen.

Hematoxylin and eosin brought out fibrin filaments, mucin, and another eosin staining substance.

Ziehl-Nielsen brought out the bodies already referred to under Weigert, from 7 to 15 microns in diameter, staining a deep red with fuchsin. They had a double contour.

He divides the cases in the literature into 9 groups:

1. Chronic bronchitis with expectoration of branching casts of the bronchial tree. Twenty-seven cases.
2. Same as above, except acute bronchitis. Fifteen cases.
3. Cases in which branching casts were not expectorated but were found in the bronchi at autopsy. Six cases.
4. Cases in which the casts showed no dichotomous branching. Eleven cases.
5. Expectoration of branching casts in organic heart disease. Ten cases.
6. Expectoration of branching casts in pulmonary tuberculosis. Fourteen cases.
7. Expectoration of small casts in association with asthma. Five cases.
8. Acute edema of the lungs. Four cases.
9. Miscellaneous. Six cases.

The review of the literature is complete and critical.

Tracheo-bronchial Cast. E. R. LeCount. (*Trans. Chicago Path. Society,* Vol. V., No. 1.)

The author reports an extensive tracheo-bronchial cast in which fibrin was demonstrated. The woman died two days after its expulsion.

The Histology of Acute Lobar Pneumonia. Joseph H. Pratt. (*Johns Hopkins' Hospital Reports,* Vol. IX, 1900.)

The author gives the following summary: Early in the

disease the alveoli contain many cells, almost identical in appearance with the transitional cell of the blood. They are usually slightly larger than the polymorphonuclear leucocyte, and contain an irregular vesicular nucleus, surrounded by a ring of protoplasm, containing either free granules, or none at all. In a case in which death occurred, eleven hours after onset, there were a great number of these non-granular cells in the exudate and no polymorphonuclear leucocytes. Their origin is uncertain; they probably arise from proliferation of the cells lining the alveoli. They may be transitional leucocytes that have migrated from the blood vessels. Similar cells are found in the lymphatics, blood vessels, and interstitial tissue of the lung, in the pleural exudate and in the bronchial lymph nodes.

Large phagocytic cells are found in all stages of the disease, but in greater number in gray hepatization. The inclusions consist chiefly of polymorphonuclear leucocytes and lymphocytes, more rarely red blood corpuscles. These cells arise probably from the alveolar epithelium. They have the characteristics of endothelial cells and resemble the phagocytic endothelial cells, described by Mallory in typhoid fever. They probably play an important part in resolution. Similar phagocytic cells occur in the lymphatics, the pleural exudate, and the bronchial lymph nodes.

The fibrin is not formed by degeneration of the alveolar epithelium, but comes exclusively from the blood.

The lymphatics are involved late in the disease. There is proliferation of their endothelium, and they become distended with cells, serum, and fibrin. Early in the disease there is no infiltration of the interstitial tissue. In cases dying during the second week, there is often a great infiltration with lymphoid and plasma cells. As a rule the longer the duration of the disease, the greater the number of plasma cells.

Peripheral Venous Thrombosis, in Pneumonia, with Report of Three Cases and a Review of those Previously

Recorded (Abstract). Walter R. Steiner. (*Johns Hopkins Hospital Bulletin,* June, 1902.)

Of this complication of pneumonia the author could find only 38 cases in the literature. In 27 out of the 32 cases in which there was a sufficiently full history the thrombosis occurred during convalescence; in one it was on the day of the crisis and in 4 during the course of the disease. It must consequently be regarded as a sequel to and not as a complication of pneumonia.

The lower extremities were always involved; the left in 16 cases, the right in 10, and both in 7 cases. Of the 41 cases, including the three of the authors, death occurred in 9, 25 recovered, no definite information given in 7.

Acute Lobar Pneumonia. A Pathologic and Clinical Study of 120 Consecutive Cases Subjected to Post-Mortem Examination. J. G. Steven. (*N. Y. Med. Jour.,* Aug. 10, 1901.)

Of the series, 88 were males, 24 females.

The greatest fatality is between the ages of 35 and 55. Seventy-five per cent of cases exposed to the influence of the weather. Most cases occur in January, March and December, May and June come next. Fewest cases in August and September. Fifty-one per cent of cases in right lung; 33 per cent in left; 16 per cent in both.

Fifty per cent of cases showed gray hepatization; 16 cases, red and gray together. The greatest number died on the seventh day. Other pathologic conditions of the lungs very often associated. Thirty-seven cases presented dilatation of the right side of the heart. Fifteen cases of general hypertrophy and dilatation. Fourteen cases of aortic valve disease. Thirteen cases, pericarditis.

In 58 cases there was cloudy swelling with enlargement and softening of the spleen. Liver: cloudy swelling, 27 cases; fatty infiltration, 20 cases. Kidneys: cloudy swelling, 38 per cent; tubular nephritis, 14 per cent; interstitial nephritis, 20 per cent.

Out of 12 cases in which the brain was examined, acute meningitis was found in four. Cultures of pneumococci were obtained from the spleen in a very large number of cases. Author favors the idea that acute lobar pneumonia is a general febrile disease.

Report of a Case of Syphilis of the Lung, with Further Consideration of the Subject. W. A. Evans. (*Trans. Chicago Path. Soc.,* Vol. IV.)

This is a report of the anatomic and histologic findings in a case of gummatous form of syphilis of the lung associated with gummata in the testicle. The gumma walls were bluish, mealy in consistency and encapsulated, being surrounded by a diffuse interstitial increase of connective tissue. They were located in the middle zone of the lung. The article is accompanied by a general discussion of the subject of lung syphilis.

Pleurisies due to Typhoid Bacillus. Remlinger. (*Revue de Médecine,* Dec. 10, 1900.)

The author arrives at the following conclusions:

1. Sometimes the bacillus infects the pleura when it infects the intestine or even earlier. This complicates the diagnosis. He asks if an antitoxin made in the inflamed pleura might not assist in the attenuation of the infection in the pleura and also in the intestine.

2. Infection may come on a variable length of time after the intestinal infection. These pleurisies are usually on the left side, are insidious, are not purulent and tend to get well.

3. Secondary infections may occur during the course of typhoid. These are rarer than the other two.

4. During tuberculosis and various other diseases the typhoid bacillus may infect the pleura.

Latent Diffuse Gangrene of the Lung, with Rupture and Fetid Pleurisy. James M. Anders and Joseph McFarland. (*Medicine,* Feb. 19, 1902.)

The authors report the above case, which was one following pneumonia. It was absolutely latent.

CIRCULATORY.

Patency of the Pericardium; Solitary Kidney; Septum in Urinary Bladder. Edw. J. Primrose. (*Glasgow Med. Journal,* Sept., 1901.)

The author relates the history and gives the description of the three above anomalies, all occurring in the same subject.

Tuberculous Pericarditis with Tuberculous Aortic Aneurysm in a Dog. Ludvig Hektoen. (*Trans. Chicago Path. Society,* Vol. IV.)

The tuberculosis probably invaded the wall from without and the inner layers of the internal thickening are due partly to proliferation and partly to hyaline thrombosis. They contain tubercle bacilli in enormous numbers, but a miliary tuberculosis did not exist, although the conditions for its development at any moment were quite well established.

The author mentions a method of staining tubercle bacilli in tissue. It is first stained by carbol-fuchsin; decolorized by sulphuric acid or Gabbet's solution, and then stained with acid orcein; washed in alcohol and cleared in clove oil. In this method the tubercle bacilli assume a violet or purplish color, which is permanent.

Report of a Case of Obliterative Pericarditis with Hepatic Enlargement and Ascites. Edward W. Becker. (*Philadelphia Med. Jour.,* March 15, 1902.)

The author after reporting a case and studying the literature reaches the following conclusions:

That pseudo-cirrhosis of the liver due to pericardial adhesions is a distinct entity. In all cases of this condition at autopsy the pericardial sac has been found obliterated.

Autopsies have shown in all recorded cases that the ascites is due to passive congestion of the liver, causing a connective tissue formation with subsequent contraction and obstruction of the portal circulation, the result of obliterative pericarditis.

In all cases of enlarged liver with ascites, without edema or enlarged spleen, a very careful examination should be made of the heart to determine whether the symptoms are not due to chronic pericarditis.

The presence of ascites with enlarged liver and systolic retraction of the precordium, together with the absence or the later appearance of edema of the ankles, is of great diagnostic value in determining the presence of chronic pericarditis.

Report of a Case in which there were Two Parietal Dissecting Aneurisms in the Same Heart. E. R. LeCount. (*Trans. Chicago Path. Soc.*, Vol. IV.)

Probably originated in an acute process that caused two weak points in the wall by degeneration or necrosis of the muscle (or both). The destruction of the muscle fibers and the blood pressure caused dilatations, in which, however, the inflammation had healed. Subsequently the blood pressure greatly enlarged one of the aneurisms.

The Extension of Aortic Aneurisms Into and Between the Walls of the Heart and Dissecting Aneurisms of the Heart. Ludvig Hektoen. (*Am. Jour. Med. Sciences*, July, 1901.)

The author states that interparietal and intraparietal extension may occur. Many so-called dissecting aneurisms of the heart take their origin in the beginning of the aorta.

Some Points in Cardiac Pathology. John Hill Abram. (*Liverpool Med. and Surg. Journal*, March, 1902.)

As a result of a study of the myocardium in the middle part of the border of the left ventricle; the right border of the right ventricle; the right and left auricles, the author concludes that there is no explanation in the myocardium of failure of compensation.

In a study of the histology of acute rheumatic aortic valvulitis, the author concludes that the histology consists in a proliferation of the subendothelial tissue without leucocytic infiltration and without the formation of new vessels.

Observations on the State of the Vascular System after

Death by Asphyxia, and by Cardiac Failure. J. A. MacWilliam. (*British Medical Journal,* April 5, 1902.)

The author discusses the reason why in death from asphyxia the right side of the heart and the vessels that lead into it are distended with blood and the left side of the heart is empty. As a preliminary observation he found that in normal conditions: (1) The blood in the two sides of the heart is under the same pressure; (2) the larger amount of blood commonly present in the right heart is due to the greater distensibility of that heart.

He concludes that the characteristic asphyxial conditions of the heart is a post-mortem development due to the rigor mortis in the cardiac muscle. In explaining why the right ventricle does not empty itself as does the left he says that in asphyxia the right heart dies, slowly, gradually, and much later than the left. Rigor in the right ventricle has very little expulsive action on account of the lateness of the onset and its general distribution in the ventricle.

Rare Cardiac Anomalies. Ludvig Hektoen. (*Trans. Chicago Path. Society,* Vol. IV.)

In this case there was general infection with bacillus mucosus capsulatus. The right ventricle was larger than the left with a wall of about equal thickness. Valves were all well formed and normal. An oval defect about 1.5 cm. in its greatest diameter was found between the pulmonary artery and aorta. The ductus arteriosus was fully patent and quite large. The ventricular septum was normal. There was regurgitation through a smooth depression under the base of the anterior aortic valve, which was attached to and carried across by a tendinous bridge.

Fatty Degeneration of the Myocardium. J. M. Cowan. (*Journal of Path. and Bacter.,* June, 1902.)

The author arrives at the following conclusions: Fatty degeneration of the myocardium is of common occurrence. In the majority of cases it is diagnosed with certainty only by examining sections fixed with osmic acid.

Three forms are met with:

1. Fat irregularly distributed throughout muscle, occurring especially in parts relatively poorly supplied with blood.

2. Diffuse changes produced by toxic condition of blood stream.

3. From local toxic action.

Microscopic evidence indicates that the condition is a true fatty degeneration of the muscle cell, markedly impairing the contracting power. If the cause is remediable the degeneration may be recovered from.

Causes:

1. A relatively insufficient supply of blood to part affected.

A. From abnormal qualitative changes in the blood—post-hemorrhagic anemia, pernicious anemia, etc.

B. From local conditions: (a) Coronary obstruction. (b) Special stress on particular parts of heart.

2. A toxic condition present: (a) In the general blood stream—phosphorous, arsenic and chloroform poisoning. (b) In the lymph channels of the pericardium.

3. A combination of the above causes may be present.

A Case of Congenital Fibrous Myocarditis. Stiassny. (*Centralb. f. allg. Path. u. path. Anat.*, 1901, No. 10.)

The author describes the heart of a boy, dying when four days old. The aortic valves were a red, glistening, knotty, ring-shaped pad, with no division into segments. The other valves intact. From this aortic deformity myocarditis had resulted. The histology of the myocarditis was the same as that in the acquired form of the disease.

The Distribution of Segmentation and Fragmentation in the Myocardium. Wm. B. Wherry. (*Trans. Chicago Path. Soc.*, Vol. IV.)

The author's observations cover 20 cases. No segmentation or fragmentation was found in 4 cases. In the right ventricle segmentation occurred in 12 cases and was always associated with segmentation in the left ventricle. The parts affected in the right ventricle were as follows:

Papillary muscle	11 cases.
Interventricular septum	4 "
Inside of anterior wall	4 "
Outside of anterior wall	2 "

In the left ventricle segmentation occurred in 15 cases as follows:

Papillary muscle	15 cases.
Anterior surface of apex	4 "
Posterior surface of apex	8 "
Lateral wall	14 "
Interventricular septum	7 "

Degenerative fragmentation and segmentation occurred twice in the left auricle at the lower border of the foramen ovale. One heart showed segmentation throughout the right and left ventricles, the other showed no other segmentation. The ages of the patients varied from 22 to 69 years.

A Rare Form of Rupture of the Aorta. Kahlden. (*Centralb. f. allg. Path. u. path. Anat.,* 1901, No. 20.)

This is a report of a rupture of the aorta in two places within the pericardial sac. The aortic cusps were adherent and thickened, but there were no other signs of old aortitis or atheroma. As a result of his histologic studies, the author concludes that the rupture was due to an abscess of the media, the infection probably coming from the pericardium through the adventitia. He speaks of the ordinary capacity of the media for resisting infection.

Unilateral Right-sided Venous Thrombosis, Associated with Cardiac Disease. Autopsy. John Winters Brannan. (*Medical Record,* Feb. 22, 1902.)

The right subclavian and right axillary veins and their small tributaries were filled with a white and red thrombus and the right brachial vein was filled with a firm dark clot. There was no thrombosis of the jugular veins.

Fibrous Adhesions of the Pericardium. H. G. Wells. (*Am. Jour. Med. Sciences,* Feb., 1902.)

The author has studied the post-mortem records of 1048 autopsies and found inflammatory adhesions of the pericardium in 128. Of the 128 cases, 57 showed old fibrous tissue adhesions. Of the 57, he ascribes 8 to rheumatism and 6 to tuberculosis. In 43 cases it was impossible to determine the cause, and in 24 of these there was total obliteration of the pericardial cavity. In 93 per cent of all the cases there was associated pleural adhesions.

The author devotes some time to the etiologic factors in pericarditis, believing that in many of these cases there is extension from the pleura to the pericardium. He also calls attention to the probability of extension from tubercular mediastinal glands and especially the glands lying between the pericardium and the bronchi. In speaking of rheumatic pericarditis he makes this comparison with tubercular forms: In the rheumatic form there is total absence of tubercular lesions in the mediastinal glands and lungs and the pleuritis existing is generally localized at the pleuro-pericardial surfaces seeming to be secondary to the pericarditis. Endocardial changes are usually present. Death is usually due to general failure in the rheumatic form, while this is the exception in the healed-tuberculous form.

He reports 4 cases of calcareous pericarditis and calls attention to the association of this form with cirrhosis of the liver.

The article concludes with a discussion of the results of pericardial adhesions studied from the standpoint of the effect on the heart muscle and the heart rhythm, and also a study of cirrhosis of the liver and its relation to the heart. He says that while in fibrous pericarditis, we get a symptom complex entitled to the name pericarditic pseudocirrhosis, in calcareous pericarditis, we get an atrophic cirrhosis. His bibliography includes 35 citations.

Three Cases of Rupture of the Left Ventricle. G. A. Rorie and John Findlay. (*Brit. Med. Jour.*, Nov., 1901.)

1. All ruptures in anterior wall of the left ventricle.

2. Autopsy. 1st Case. Heart muscle found to be in an advanced state of fatty degeneration, and showed fatty infiltration. No further disease of heart. Other organs: Softening of the brain, and primary cancer of gall-bladder and liver. 2d Case. Heart fatty. Calcification of aortic valves. Other organs healthy.

THE BLOOD AND THE DUCTLESS GLANDS.

The Pathologic Changes in Hodgkin's Disease. D. M. Reed. (*Johns Hopkins Hospital Reports,* Vol. X., Nos. 3, 4 and 5.)

The author has studied the histology of the enlarged lymph nodes with regard especially to the possible relation of Hodgkin's disease to tuberculosis and to tumors. She concludes that the histology is not that of any tumor. She does not believe that some focal necrosis, abundant giant cells and epithelioid cells indicate a tubercular origin. She concludes:

1. Hodgkin's disease should be limited to a clinical and pathologic entity, characterized by painless progressive glandular enlargements, without the blood changes of leukemia.
2. The growth presents a specific histologic picture, suggesting a chronic inflammatory process.
3. Microscopic examination is sufficient for diagnosis.
4. The presence of eosinophiles strengthens the diagnosis.
5. Tuberculosis has no direct etiologic relation.

Leukemia. Walz. (*Centralb. f. allg. Path. u. path. Anat.,* Dec. 15, 1901.)

This article is a critical study of the subject continuing the article of Muller in this same *Centralblatt* in 1894. He writes of the histology of the blood and of each organ; the association of leukemia, acute and chronic, with other diseases and with tumors; the relation of the different forms of leukemia to each other, and the etiology of the

disease. There is an extended discussion of the relation to the disease of the bodies found by Löwit.

Löwit proceeded as follows: Fixation by heat at 120 C. 2 hours. Stain in warm concentrated thionin solution, wash, dry; counterstain with warmed Orth's lithium carmine, wash, dry.

In myelogenic leukemia Löwit found a large staining body inside the lymphocytes. In lymphatic leukemia they were seldom found in the peripheral blood. They were more often in the blood-forming organs.

The article is preceded by a bibliography containing 223 references.

On the Question of the Origin of the Basophilic Granules in the Red Cells and their Relation to Polychromophilic Degeneration. G. Tarvein. (*Berliner klin. Woch.*, Sept., 1901.)

The author calls attention to the fact that granules in the red blood corpuscles have been noted by Ehrlich, Askanezy, Lazarus, Engel, Grawitz and Cohn. He has observed a case of pernicious anemia due to bothriocephalus latus; later complicated by catarrhal pneumonia. After the pneumonia the red cells rose in three days from one-half million to one and a half millions and simultaneously there appeared many mononuclears, leucocytes, megaloblasts and granular red blood cells. About one-third of the red blood corpuscles were polychromatophiles. On the basis of the observation of this case the author comes to the following conclusions:

1. Basophilic granules are found only in young red blood corpuscles and must be taken as a sign of regeneration.

2. Polychromophilic degeneration, so called, is found only in young red blood corpuscles and is also a sign of regeneration.

3. The fine and the coarse basophilic granules are of the same origin.

4. Polychromophilic granules are in all probability produced by dissolution of the nucleus in the protoplasm.

5. Each of these granules and also the nucleated red blood corpuscles is a sign of the increased function of the bone marrow.

It is not only possible but plausible that an increase in the function of the marrow of the bones will result in granular and polychromatic forms, while a still greater increase will produce nucleated corpuscles. This would be an explanation of the granular corpuscles after malaria (Plehn) and after bleeding (Cohn).

6. The author cannot agree with the theory of Grawitz, *i. e.*, that these granules are varieties of degeneration.

7. The existence of basophilic granules in nucleated red blood corpuscles does not prove that the granules do not come from the nucleus.

8. The appearance of megaloblasts is not necessary to the diagnosis of progressive pernicious anemia. The megalocytes are enough.

Further Studies of the Granular Degeneration of the Erythrocyte. Alfred Stengel, C. Y. White and Wm. Pepper. (*Am. Jour. Med. Sciences,* May, 1902.)

The authors have worked out the following conclusions:

"1. Karyolytic and karyorrhexic changes may be observed in nucleated red cells without showing any granular changes in the protoplasm of the cells; on the other hand, granular degeneration may accompany these changes without association of the nuclear and granular processes.

"2. The granules are observed in karyokinetic red cells and we have seen them associated with the several stages of the dividing nucleus. We cannot believe that such progressive and retrogressive changes can be present in the nucleus at the same time, without internal evidence of degeneration.

"3. The very early appearance of these granules in the blood taken from the peripheral circulation (25 hours after a dose of 7½ grains of acetate of lead taken by one of us) to a certain extent indicates a probable beginning of the destructive changes in the erythrocytes (non-nucleated of the peripheral blood, rather than in the erythro-

cytes (nucleated) at the moment in process of formation in blood-making organs.

"4. The granules observed in the bone marrow were absolutely the same as those seen in the peripheral blood. Those in the nucleated cells, chiefly normoblasts, showed no evidence of derivation from the nucleus, the nuclei being in each case normal in size, shape and staining qualities, and like those of the neighboring cells which did not contain granules.

"5. Finally it seems to us that in certain cases of leukemia in which great numbers of nucleated red cells are always present, if these granules were nuclear derivatives, distinct steps or transitional forms could be demonstrated. Such is not the case. On the contrary, distinct degenerative changes, karyorrhexis, karyolysis, pyknosis, atrophy of the nucleus, etc., are present sometimes with and sometimes without granular protoplasm, but there are never in our experience any transitional changes to indicate gradual destruction of the nuclei with liberation of a substance which has gone to form granules. In addition very many of the nucleated cells showing granular degeneration of the nucleus contain no granules in the protoplasm."

Fatal Anemia Presenting some Unusual Blood Changes. O. K. Williamson and E. W. Martin. (*British Med. Journal,* May 10, 1902.)

This case the authors state had the appearance of pernicious anemia associated with leukemia and they think that it is likely that both diseases sometimes appear in the same person at the same time. The blood examination in this case was: red cells, 400,000; hemoglobin, 12 per cent; leucocytes, 45,000, of which the lymphocytes comprised 99.06 per cent; polymorphonuclears, .56 per cent, and myelocytes, .37 per cent.

Chlorosis, its Diagnosis and Treatment and its Relation to Tuberculosis and to Round Ulcer of the Stomach. Gustav Futterer. (*Chicago Medical Recorder,* July, 1901.)

The author wishes to call attention to the great im-

portance of recognizing this disease early and the institution of proper treatment. He believes that chlorosis in the early years and secondary anemias in the later years predispose to the formation of round ulcer of the stomach and after their formation prevents their healing. He has performed experiments on animals to prove this assertion and recommends that in the treatment of round ulcer the blood be treated before the institution of the prescribed method of handling this disease.

He recommends that in injecting animals with sputum suspected of containing tubercle bacilli, we first produce a secondary anemia in the animals, thus rendering the test much more delicate.

Generalized Tuberculous Lymphadenitis, with the Clinical Picture of Pseudoleukemia. Thomas R. Crowder. (*Trans. Chicago Path. Society,* Vol. IV., p. 314.)

Report of a case in which tubercle bacilli were found in abundance in the lymphatic glands. Inoculation experiments were however a failure. The author concludes: "So far, investigation does not warrant us in concluding that all pseudoleukemias are even probably tuberculous in origin, but it is at least established that tuberculous lymphadenitis may give rise to the symptom complex and anatomic findings which furnish, thus far, the only basis for the recognition of that disease as a distinct entity."

The Relation of Tuberculosis to Pseudoleukemia (Sternberg's Disease). Joseph Sailer. (*Philadelphia Med. Journal,* April 12, 1902.)

We quote the author's conclusions, which are as follows:

"In conclusion then it can only be said that the time has not yet come for any dogmatic statement upon the question. None of the evidence hitherto presented can be regarded as decisive and yet, as Pinkus says, the gradual accumulation of positive evidence and the absence of entirely satisfactory negative evidence rather tends to confirm the supposition that the majority of cases of pseudoleukemia, if not all, will ultimately be recognized as tuberculous in nature."

Two Cases of Splenectomy. Blanquinque. (*Gaz. heb. de Méd. et de Chir.,* 1901, No. 99.)

The author reports two cases of splenectomy, one for an enlarged spleen (non-leukemic) and one for a leukemic spleen, proving that the former should be removed, the latter not.

Cysts of the Spleen and Hernia. M. Schmidt. (*Virchow's Archives,* Bd. 164, 1901.)

The superficial cysts of the spleen are due to rupture of the capsule. There is great need for better study on the histology of the spleen and especially of the lymph supply.

Thrombosis of the Central Vein of the Right Adrenal with Engorgement and Necrosis. P. G. Wooley. (*Jour. Med. Research,* March, 1902.)

The author relates the post-mortem findings of an 11 months old baby that had had measles, but the cause of death was obscure. The right adrenal was imbedded in a mass of blood the size of a goose-egg. Corresponding to the site of the central vein was a whitish cord the size of a match. This resembled a thrombus. There were two small accessory adrenals on the right side. In the left adrenals there were a few small hemorrhagic foci.

Microscopically the right adrenal cells were destroyed. The mass was blood. The central white cord was a laminated thrombus.

The diagnosis was thrombus of the central vein and resultant hemorrhagic infarcts in the adrenal.

Embryonal Renal Adenosarcoma. M. Herzog and Denslow Lewis. (*Trans. Chicago Path. Society,* Vol. IV., p. 267.)

The authors believe that the growth develops in the center of the kidney. The nephrotome is not cut off at the normal site, but in such a manner that a part of the myotome is severed from the main mass and remains in connection with the nephrotome. Epithelial as well as connective tissue elements show an exquisite embryonal type, which is rarely found so very well pronounced in tumors.

The changes in the kidney tissue proper all appear to be exclusively the result of pressure and pressure atrophy.

The Histologic and Histogenic Features of a Malignant Medullary Hypernephroma of the Kidney. J. C. Ohlmacher. (*Trans. Chicago Path. Society,* April, 1902.)

The peculiarity in this case was that while most of the tumor was composed of structure suggestive of the medullary portion of the adrenal, the structures found growing into the vessels indicated a cortical origin of at least those cells.

It will be interesting to have Croftan's observations of the starch converting powers of these tumors extensively applied.

Report of a Case of Malignant Hypernephroma. E. R. LeCount. (*Trans. Chicago Path. Society,* April, 1902.)

This is a report of one of those tumors developing from adrenal rests. The tumor grew from the lower portion of the kidney. It was found to have the microscopic characteristics of the middle zone of the adrenal. It had caused extensive bony involvement and there had been fracture of the right ilium and left femur.

Experimental Tuberculosis of the Adrenals. B. de Vecchi. (*Centralblatt f. allg. Path. u. path. Anat.,* 1901, No. 14.)

The adrenals are important bodies of extra-uterine life: this is proved: 1st, by the more or less rapid death of the animals from whom they have been extirpated; 2d, by the hypertrophy of one adrenal, when the other has been taken away; 3d, by the permanent cell activity in which they are found in post-fetal condition; 4th, by the absence or profound alteration of these organs in non-viable monsters. From anatomic and embryologic investigations, they (adrenals) must be looked upon as glands, which, at least during their development, are in connection with the sympathetic apparatus.

Function: 1. To remove toxic products, caused by muscular work. 2. Others believe that it produces a secretion of the highest importance to life.

The author laid bare the adrenals of rabbits, and inoculated tubercular cultures (the virulence had previously been tested on guinea pigs), closed up the wound carefully and antiseptically. Results: Gradually increasing emaciation, temperature indefinite, number of red cells lowered, tremblings and paresis of the hind legs. Post-mortem showed changes according to age of inoculation, from simple tubercular infiltration to caseation and connective tissue growth. The neighboring ganglia (celiac) were affected only in one case. Principally the gray substance of the central nervous system and the ganglion cells were affected. There was no spreading of the tuberculosis to other organs, no peritonitis, etc. Death resulted from intoxication.

Pituitary Tumor and Acromegaly. Ferrand. (*Gazette des Hopitaux,* March 28, 1901.)

Ferrand reports an autopsy on a woman with acromegaly and diabetes. At the autopsy he found a tumor of the pituitary the size of a pigeon-egg. This tumor pressed on the chiasm. He considered it an adenoma. There was also hypertrophy of the thyroid and absence of the thymus.

Further Experiments on Extirpation of the Pituitary Body and Transplantation of Carcinoma and Thyroid Tissue in the Pituitary Gland. Freedman. (*Berliner klin. Woch.,* May 12, 1902.)

The author continues experiments previously reported. He removed the pituitary bodies of adult cats and killed them from 3½ to 9 months afterwards. Examining the organs post mortem he found the pituitary body completely absent, and the bone wounds resulting from the operation healed. The internal organs and especially the thyroid were entirely unchanged.

He concludes that in adult cats the pituitary body is not of vital importance or else its function can be assumed by other organs. He does not think that the thyroid assumes this function because in one case he removed both the thyroid and the pituitary body and the cat lived in

good health for 23 days, dying at the end of that time of broncho-pneumonia.

As a result of similar experiments done on young cats he concludes that the pituitary is not necessary for development and growth. He implanted some carcinomatous and sarcomatous tissues derived from man and from dogs over the pituitary body. The tumor disappeared without producing transformation of the body. In another case he implanted a piece of thyroid obtained from an adult cat, into the pituitary. One-and-a-half months later the cat died of some disease accompanied by suppuration in the eyes and nose. Post mortem the wound in the bones was healed up entirely. Microscopic examination of the pituitary showed that the thyroid had retained its own structure and had not modified the structure of the pituitary.

The Normal and Pathologic Histology of the Human Hypophysis Cerebri. C. Benda. (*Berliner klin. Wochensch.*, Dec., 1900, Hft. 52.)

The author, after a careful study of the anatomy, histology and physiology of this gland, applied his information to four cases of acromegaly. He concludes that all four cases showed changes in the hypophysis, and that the changes were in the glandular tissue of the central bodies.

Formation of Lymph Vessels in Pleuritic Adhesions. Ludvig Talke. (*Beitrage f. path. Anat. u. allg. Path.*, Bd. 32, Heft. 1, 1902.)

The results of the author's investigations show that there is new formation of lymph-vessels in these adhesions. That these lymph-vessels are formed in several ways; the method of formation being much the same as that of blood-vessels. The new vessels are formed from the endothelial cells of the pre-existing vessels.

Typhoid Fever with Trichinosis and Eosinophilia. McRae. (*Am. Jour. Medical Sciences*, July, 1902.)

The author calls attention to the report of a similar case by Fischer. (*Deutsche med. Woch.*, 1898, No. 24.)

The author reports a case which was diagnosed as typhoid in which eosinophilia was present from the be-

ginning, and eventually trichinæ were found. The general symptomatology of trichinosis was present from the beginning. The diagnosis of typhoid appears to the Editor hardly justified. Widal was not given until 47 days after the attack began. Diazo was not given until after 24 days. The large mononuclear leucocytes were not increased. The diagnosis of typhoid seems to have been based on the continued fever, furred tongue, rose spots and enlarged spleen. The author then proceeds to show that rose-spots and enlarged spleen may be due to trichinosis alone. His differential blood counts are of considerable interest.

Blood count made on the 14th day showed leucocytes, 11,000; polymorphonuclears, 65 per cent; eosinophiles, 28 per cent.

On the 16th day: polymorphonuclears, 48.2 per cent; mononuclears, 8 per cent, and eosinophiles, 43.8 per cent. In this examination one-fifth of one per cent were typical eosinophiles and the balance were between neutrophiles and eosinophiles.

19th day: leucocytes, 12,000; eosinophiles, 39 per cent; polymorphonuclears, 51 per cent.

21st day: leucocytes, 12,500; eosinophiles, 37 per cent; polymorphonuclears, 54.4 per cent. The granules in these eosinophiles were typical.

25th day: pneumonia had supervened. Leucocytes, 15,250; eosinophiles, 29 per cent; polymorphonuclears, 60 per cent.

29th day: leucocytes, 11,500; eosinophiles, 24 per cent; polymorphonuclears, 67.4 per cent.

36th day: leucocytes, 21,700; eosinophiles, 12 per cent; polymorphonuclears, 71 per cent.

45th day: leucocytes, 16,000; eosinophiles, 4 per cent; polymorphonuclears, 78 per cent.

62d day: leucocytes, 16,000; eosinophiles, 17 per cent.

McRae calls attention to the fall in eosinophiles and the increase in polymorphonuclears during the pneumonia; after it the polymorphonuclears fell and the eosinophiles increased. He believes that the forms transitional be-

tween eosinophiles and neutrophiles are in line with the conclusions reached in recent observations.

[The Editor in routine use of Wright's stain has found gradations between neutrophiles and eosinophiles. He frequently finds a small number of granules in the hyaline corpuscles. These are of different sizes. Usually they stain like neutrophiles, occasionally like eosinophiles. Occasionally both neutrophilic and eosinophilic granules are found in the same corpuscle.]

Eosinophilia in Filariasis. Wm. J. Calvert. (*Johns Hopkins Hospital Bulletin,* June, 1902.)

The author believes that all cases show a decided eosinophilia associated with filariasis. In the most recent case the highest eosinophilia was found. In cases of long standing an increase of the eosinophiles is not found.

These facts tend to show that in the early stages of filariasis, leucocytosis with an increase of the eosinophiles may be looked for, and that as the disease progresses the leucocytosis and the increased eosinophiles gradually decrease to normal.

The Blood in Cases Affected with Filariasis and Bilharzia Hematobia. A. C. Coles. (*British Med. Journal,* May 10, 1902.)

The author states that there was a great increase in the eosinophiles, they constituting from 15 to 20 per cent of the total number of white cells.

Myxedema in Mother and Child. S. W. MacIlwaine. (*British Medical Journal,* May 24, 1902.)

The author reports the case of a mother who was in perfect health until 1895. From 1895 to 1898 there were symptoms that were diagnosed as Grave's disease; there was much enlargement of the thyroid and its removal was advised. There had been comparatively good health since 1898. The thyroid is hard and enlarged on one side. The skin is dry and harsh. The hair has fallen out.

In 1899 her first child, a girl, was born. This child was healthy until one year old, when it contracted dysentery, this was followed by what was diagnosed as myxedema.

Thyroid extract relieved the symptoms. The author concludes that the myxedema was of toxic origin in both mother and child.

Primary Sarcoma of the Thyroid Gland. A. G. Lartigau. (*Am. Jour. Med. Sciences,* August, 1901.)

The author states that primary sarcoma of the thyroid gland is rare, but probably of more common occurrence than statistics show. It is less frequent than primary carcinoma. It is commonly associated with goiter. Those cases developing in persons between 40 and 60 years of age show a higher percentage of previous goiter than in younger individuals. Goiter associated with sarcoma of the thyroid is more common in women than in men.

Sarcoma of the thyroid occurs oftener in late than in early life. The age of greatest frequency is between 40 and 60. Sex is probably an unimportant element in its development.

The primary tumor most frequently originates in the right lobe of the thyroid body. This distribution seems to be more frequent in men than in women. The clinical course of the disease is usually relatively acute. Involvement by pressure of new growth of the trachea or larynx is common. Metastases occur through blood or lymph channels, or both. Round and spindle or mixed celled sarcomata are most common. Angiosarcomata are not rare.

THE DIGESTIVE TRACT.

Pneumococcus Peritonitis in Children. Michant. (*Gazette des Hopitaux,* March 30, 1901.)

The author quotes the following figures:

Pneumococcus in the mouths of people who have had no pneumococcic infection: Fränkel, 15 per cent; Weichselbaum, 20 per cent; Netter, 20 per cent; Goldenburg, 50 per cent.

In subjects that have had pneumococcic infection: Weichselbaum, 58 per cent; Netter, 80 per cent, while Bezancon and Griffon say it is always present.

Under the head of etiology they say that it can be found in any age of infancy. That it is distributed in the sexes in the proportion of 27 girls to 6 boys. In these 33 cases the histories of the patients have been good and trauma was seldom found as a determining factor. In 33 cases it was a primary infection 27 times. In six it was secondary—lobar pneumonia, three times, broncho-pneumonia two times, sore throat once.

It was found in two anatomic forms—encysted and general. 1. Encysted: The exudate usually extended from the umbilicus to the pelvis. The anterior wall of the cyst was the parietal peritoneum; the posterior wall was the matted intestines and omentum; the inferior border, the matted pelvic organs; superiorly, it was bounded by the umbilical zone and it rarely reached to the anterior border of the liver. There was usually from one to three liters of thick, creamy, yellowish or greenish pus.

2. The general form is subdivided into two: (a) diffuse, (b) general purulent.

As to the prognosis: Of 22 cases of encysted peritonitis 2 died. Of 17 cases of primary encysted peritonitis 2 died—12 per cent. In 5 cases of secondary peritonitis all were cured. General peritonitis, 11 cases, 9 deaths—82 per cent. These were divided into diffuse septic, 7 cases, 6 deaths; diffuse purulent, 4 cases, 3 deaths. The mortality in the uncomplicated purulent form was 50 per cent.

Condensed Review of the Literature on Peritonitis, 1885-1900. Max von Brunn. (*Centralb. f. Path.*, Nos. 1, 2, 3.)

The literature on peritonitis has multiplied at such a rapid rate during more recent years that in its present condition it is more or less inaccessible. The author has, therefore, with much labor, condensed the literature (1885-1900) to a clear and accessible review, in which reference is made to 722 different works, which he cites with special reference to pathologic anatomy and etiology, touching

only lightly upon works treating of the clinical and therapeutic aspects of peritonitis.

Only inflammatory changes of the peritoneum are treated of, therefore no reference is made to works on non-inflammatory forms (ascites). Most attention is given general peritonitis, the local varieties being handled more briefly. One of the most important forms of local varieties, perityphlitis, is not treated of at all, as the literature of this affection is too extensive and requires separate consideration.

Acute General Gonorrheal Peritonitis. Guy L. Hunner and N. M. Harris. (*Bulletin of Johns Hopkins Hospital,* June, 1902.)

The authors contribute seven cases occurring at the Johns Hopkins Hospital.

Idiopathic Dilatation of the Esophagus. James Swain. (*British Medical Journal,* Nov. 16, 1901.)

The author believes this a rare condition in which a dilatation exists without any obvious mechanical obstruction, and its recognition as one of the causes of dysphagia is a matter of importance. In a few cases the occurrence of an injury appears to be a definite etiologic factor.

A Peculiar Gastrolith leading to Perforation and Death. Maximillian Herzog. (*Trans. Chicago Path. Society,* Vol. IV.)

The gastrolith was formed of persimmons in the stomach of a child 3 years of age. It caused perforation and death and at the autopsy it was found to form a complete cast of the stomach.

Primary Sarcoma of the Esophagus and Stomach. Wm. T. Howard. (*Jour. Am. Med. Assoc.,* Feb. 8, 1902.)

PRIMARY SARCOMA OF THE ESOPHAGUS. Conclusions drawn from an analysis of twelve recorded cases of sarcoma of esophagus are as follows:

1. The disease is more common in males than in females, and at the period of life during which carcinoma most frequently occurs. It may, however, unlike carci-

noma, occur in early life, between four and twenty-five years.

2. Nine of the twelve cases involved the lower half of the organ.

3. While the tumors usually nearly surrounded the lumen, in three cases they formed pedunculated or polypoid masses, projecting into the lumen.

4. Symptoms of esophageal obstruction occurred in eleven of the twelve cases.

5. There was perforation, with involvement of the respiratory organs, in four cases.

6. All the varieties of sarcoma except angiosarcoma have been found, the round-cell variety standing first in frequency, one-fourth of the cases.

7. Metastases occur rather frequently (five out of twelve cases), and in two cases were widespread.

8. The clinical diagnosis has not been made. There are no certain and constant clinical points of difference between sarcoma and carcinoma of this organ, the symptoms depending upon the same conditions—obstruction and cachexia—in the two diseases.

9. Sarcoma runs a more rapid course, and a fatal issue is to be looked for earlier than in carcinoma. The greater size of the sarcomatous growth is probably responsible for this.

10. The differences in the character, distribution, and period of the pain in the two affections, described by Starke, are not mentioned by other observers.

PRIMARY SARCOMA OF THE STOMACH. Report of four cases. Conclusions:

1. Gastric sarcoma is more common than is generally supposed, at least 16 cases being recorded. Careful routine microscopic examination of all tumors met with at autopsy and operation will probably show a marked increase in the number of these tumors.

2. The sexes are affected in about equal proportions; 37.7 per cent of cases occur before the fortieth year, and 11.4 per cent below the twentieth year.

3. The pyloric end was involved in only 26.23 per cent of the cases, as against 60 per cent for carcinoma (Welch), and caused stenosis in only 8.19 per cent of the entire number of cases. Diffuse growths occurred in 21.31 per cent, while the cardia was involved in 4.9 per cent. The posterior wall and greater curvature are commonly involved.

4. Gastric sarcoma may reach a large size, that of a man's head, and may project as a large mass into the lumen of the stomach, or into the peritoneal cavity, extending below the umbilicus.

5. Gastric sarcomata commonly start in the submucosa or muscularis, and are as apt to ulcerate and cause hemorrhage as is carcinoma.

6. All the histologic varieties have been found in the stomach.

7. Most cases usually run an acute course, the average duration of life being from nine to ten months.

8. Metastasis is not as frequent as in carcinoma, but may be widespread. The liver is invaded in 11.47 per cent of cases as against 30 per cent for carcinoma. (Welch.)

9. There are no diagnostic clinical signs of sarcoma of stomach. The diagnosis has been made by microscopic examination of material obtained from the stomach.

10. A diagnosis of sarcoma is warranted in the case of a large tumor connected with the stomach, especially when it projects below the umbilicus.

11. A tumor of the stomach in a person under twenty years of age is almost certainly sarcoma.

Uremic Ulceration of the Stomach and Small Intestines. Mathieu and Roux. (*Arch. de Médecine,* Jan., 1902.)

This article includes the report of an autopsy on a woman who had died of chronic interstitial nephritis. The interest attaches to the condition of the stomach and small intestines. There were six ulcers along the lesser curvature of the stomach, one of which presented the physical characteristics of round ulcer. There was a very long

ulcer along the free border of the small intestines. There were no ulcers in the large intestines.

Gastritis Tuberculosis. Prscwaski. (*Virchow's Arch.*, April 15, 1902.)

The author has seen five cases of this infection in the bodies of tubercular people. The peculiarities of the ulcers are:

(1) Shape; (2) in some cases the submucous tissue is much inflamed; (3) the muscularis, the subserosa, and the serosa are relatively seldom affected by tubercular process; (4) tubercle bacilli are present in small numbers only in the edges and in the bottom of the ulcer.

The form of ulcer in the stomach is round. This is probably because the course of the lymph and blood vessels is less oblique in the stomach than in the intestines.

Tubercular ulcer of the stomach is most often situated in the pyloric region. It is usually single, but sometimes there are two or more. In this latter case they sometimes become confluent, converting the whole pylorus into one superficial ulcer. As an etiologic consideration it may be stated that in all five of the author's cases there was a long-standing phthisis fibrosa present. To produce the tubercular gastritis a long continuation of the tubercular processes may be required.

Predisposing causes: (1) old catarrhal inflammation; (2) the presence of a large number of lymph follicles in the gastric mucosa; these are most numerous at the pylorus; (3) long retention of sputum, containing Koch's bacillus, in the stomach; (4) the presence of ulcers of non-tubercular nature, erosions, and temporary injuries, infections, etc.

False Diverticula of the Intestines. Martin H. Fisher. (*Trans. Chicago Path. Society,* Vol. IV.)

The author states that it is the generally accepted belief that diverticula follow the paths of the venous sheaths, and while this in the main may be correct he cannot accept it in its entirety.

Although the presence of the blood vessels is the prime

predisposing cause leading to the production of the mucosal hernia, still, once started, the saccule follows the path of least resistance. This may or may not be the sheath of the blood vessel. Instead of following the latter, the mucous membrane may spread between the layers of the muscular tunic, or it may spread through the connective tissue between the muscularis and the serosa in places where it is impossible to establish any connection between the diverticulum and the blood vessels.

Chronic Hyperplastic Tuberculosis of the Intestines. A. J. Lartigau. (*Journal of Experimental Medicine,* Vol. VI., No. 1.)

The author includes a bibliography with 55 references. He reports one case. There was hyperplasia of the intestine, beginning at the end of the first third of the ileum and extending to the sigmoid. The greatest thickening, 2.7 cm., is in the cecum. Histologically, the striking points are the absence of necrosis, the focal arrangement, the giant cells and the very small number of epithelioid cells. His case like the cases usually observed has little in common histologically with tuberculosis. Tubercle bacilli are present in very large numbers. He thinks his a case of primary tuberculosis in an adult.

Such a histology as this suggests the possibility that many lesions, now thought to be non-tubercular, may be tubercular. (Suggestion is made that the rectal inflammations so frequently diagnosed as syphilitic may be tubercular.) An anatomic feature of importance was the stiff tubes with diminished lumen. The thickening of the wall was quite uniform, in keeping with the generally diffuse character of the process. There was relative freedom from adhesions. The few adhesions present were in the large intestines. Another anatomic point was multiple polypoid or papilloma like tumors projecting into the lumen of the intestine.

Some of the article is devoted to symptomatology and to treatment.

On the Alterations Produced in the Large Intestines of

Dogs, by the Ameba, by Heat and by Various Chemic Substances. H. F. Harris. (*Hatfield Prize Essay, College of Physicians of Philadelphia.*)

Part I is devoted to technic. This is a subject to which the author has devoted a great deal of thought both in general and in connection with this work. A few points will be noted here.

For a fixative he prefers Bensley's solution—½ per cent bichromate of potassium in water, saturated solution of corrosive sublimate in alcohol. Mix equal parts of the above solutions at the moment of use. Fixing requires from ½ to 2 hours. For general staining he prefers his own modification of Mayer's acid hemalum. For mucin staining he advises Mayer's Muchaematin. For elastic tissue he advises a stain originated by himself. It is made by dissolving 2 gm. hematoxylin and 1 gm. aluminum chlorid in 100 c.c. 50 per cent alcohol. Bring to a boil, add 6 gm. mercuric oxid slowly. Remove from flame and cool rapidly. Filter and add 1 drop HCl. For mast cells and plasma cells he uses carbol toluidin blue. For fibrin he used Weigert's stain.

Part 2 is a study of the anatomy and histology of the large intestine in dogs.

Part 3 is devoted to a discussion of the histologic changes in experimentally induced amebic dysentery in dogs.

In discussing whether the ameba coli or the bacteria usually associated with it are responsible for the dysentery, he decides that the ameba is the cause. This conclusion is based on the following points:

1. Injection of human feces containing ameba into the intestines of young puppies caused dysentery. The same was not true when adult dogs and cats were used.
2. Cultures of the bacteria from these feces did not produce dysentery.
3. Ameba coli could not be cultivated.
4. Cultures of the Shiga bacillus, obtained from Flexner, did not produce dysentery.
5. The ameba were constant in the lesions.

The anatomy and histology of the inflamed intestines do not differ very much from that usually described. The lesions were not limited to the large intestines. The ulcers were frequently limited to the mucosa. The muscularis mucosa was quite resistant. On reaching the submucosa the muscularis mucosa was often seen overhanging. The circular and longitudinal muscular tunics were always spared.

Part 4 deals with the effect of various harmful agencies on the large intestine. Harris studies the effect of dry heat six hours before death. Further studies concerned dilute liquor potassæ for 12 hours; liquor potassæ undiluted for 24 hours; liquor potassæ for 20 days; liquor sodæ 24 hours; solution of ammonium hydroxid (strength same as liquor potassæ) 24 hours. These were for the purpose of testing strong alkalies.

The tests of the effects of acids were made with dilute sulphuric, 12 hours; dilute sulphuric, 24 hours; dilute sulphuric, 20 days; dilute nitric, 24 hours; dilute acetic, 24 hours. Other dogs were injected with 10 per cent nitrate of silver, 24 hours; dilute solution of nitrate of silver, 18 days. Colchicum by mouth, 12 hours; colchicum by mouth, 56 hours. Carbolic acid, by rectum, 18 days; copper suphate, 8 per cent solution, by rectum, 8 hours; the same, 75 hours.

The details cannot be included in an article such as this. One is struck with the comparatively even results. The destruction of tissue from the caustic alkalies is greater but still not incomparable to the changes from the internal administration of colchicum. A striking thing was the later tendency of the inflamed zones to form ulcers. There was a good deal of irritation, ofttimes hemorrhagic extravasation. The lymph nodes were rather spared. The serous and subserous structures were spared. It is thus seen that the ulcers are shallow.

Tuberculosis of the Appendix. Crowder. (*Trans. Chicago Path. Soc.*, Vol. V., No. 1.)

The author reports a hyperplastic tuberculosis of the

vermiform appendix. His valuable article on hyperplastic tuberculosis of the intestines (*Am. Jour. Med. Sciences*, June, 1900) is to be remembered.

Common Anomalies of the Colon. W. W. Babcock. (*International Medical Magazine,* March, 1901.)

The author gives seven cases of anomaly with description and cuts. These seven cases occurred in 30 consecutive autopsies. The author calls attention to the difficulty of diagnosis of abdominal tumors associated with such anomalies.

Topographic Anatomy of the Abdominal Viscera in Man. Christopher Addison. (*London Lancet,* March 30, 1901.)

The author has studied the relations of the viscera to the surface of the body and to each other. He recommends some new lines for the division of the different regions. He concludes:

1. That a high placed stomach is usually associated with the liver placed well up beneath the ribs and often small, and with a highly placed transverse colon, which in most cases is also distended. The colon may come upwards in front of the stomach without apparently raising the whole stomach, merely pushing it backwards into the stomach bed.

2. That a low position of the stomach, referring to the greater curvature, appears to be especially associated with a liver extending low down and perhaps enlarged and with a low transverse colon. But the colon by an increase in the length of its mesentery may sink away from the stomach, which may remain in normal position.

3. That the liver is undoubtedly chiefly responsible for alterations in the level of the pylorus. Mere distention of the stomach, apart from a low position of the liver, is not sufficient to produce material downward displacement of the pylorus.

The author also discusses the position of the various other organs.

Aneurisms of the Mesenteric Arteries. Gallavardin. (*Gaz. heb. de Med. et de Chir.,* Oct. 13, 1901.)

Out of 23 such tumors, 21 were in the superior mesenteric and two were in the inferior mesenteric artery. They usually occur in the first portion of the artery. The tumor is sometimes sharply delineated and occasionally it is ruptured producing dissecting aneurisms or somewhat limited hematomas.

Among the most frequent causes are syphilis and trauma, but the author believes the most common cause is infectious endocarditis.

A Description of the Appearances in 5 Cases of Diaphragmatic Hernia. C. A. Parker. (*Trans. Chicago Path. Soc.,* Vol. IV.)

The author believes this condition to be fairly frequent, but the diagnosis is made in only about 2 per cent of the cases.

Perforation of the Intestines by Ascaris Lumbricoides. Solieri. (*La Riforma Medica,* 1902, Vol. 18.)

The author reports the case of a man who was suddenly seized with acute peritonitis and symptoms of shock. He was operated upon but subsequently died. It was found that a worm had penetrated the intestinal wall, passing into the abdominal cavity and through the perforation infection of the peritoneum had occurred. Histologic examination indicated that the perforation had occurred through an entirely normal intestinal wall.

At the recent meeting of the American Medical Association, Ager presented to the Section on Pathology a case almost similar in detail. He inclined to the opinion that the worm had become lodged and its head driven rather passively through the sound intestinal wall.

Prof. Ward of the University of Nebraska, in his discussion, while admitting the lack of flexibility of Ascaris, did not think it possible for the head to be thus driven through the wall. Both he and W. A. Evans spoke of the not infrequent finding of ascaridæ in the intestines of the lower

animals, especially pigs, with the heads of the worms embedded in the mucosa and submucosa of the intestines.

On the Occurrence of Strongyloides Intestinalis in the United States. W. S. Thayer. (*Jour. Experimental Medicine,* Vol. VI., No. 1.)

The article begins with a historical review of strongyloides intestinalis. He reports three cases, two of which, certainly, and one probably originated in this country. One had amebic dysentery and amebic abscess of the liver. The other two suffered from diarrhea and secondary anemia. While a complete biologic chain was not established, the author feels certain of the identification of the parasite. In a foot-note he refers to a case of anchylostomiasis observed by Yates. This is reported in Johns Hopkins Bulletin, Vol. XII., No. 129, p. 366.

The bibliography cited is very extensive.

[At the last meeting of the American Medical Association, Smith of Atlanta reported cases of anchylostomiasis occurring in Georgia.]

The Pathogenesis of Balantidium Coli. Harlow Brooks. (*New York University Bulletin of the Medical Sciences,* Vol. 2, No. 1 (quoted from Medicine).

The author has found this organism present in large numbers in the fecal matter of monkeys suffering from ulcerative colitis. The post-mortems showed balantidium coli in the intestinal walls, as deep as the muscle tunics.

A New Species of Hook Worm. C. W. Stiles. (*Am. Medicine,* May 10, 1902.)

The author has studied the parasites in the cases of uncinarias is observed by Claytor, Smith of Galveston, Texas, and Ashford of Porto Rico. He found that these specimens differed from the Uncinaria duodenalis of Europe. It differs from the duodenalis in that there are no hook-like teeth. These are replaced by a pair of semilunar plates. The eggs are larger, measuring 40x72 microns.

In a foot-note he acknowledges the receipt of a specimen of Uncinaria duodenalis received from a case in Baltimore.

Cystic Liver. Wm. Mueller. (*Archiv f. pathologische Anatomie,* Bd. 164, 1901.)

Mueller, after describing his cases minutely and giving a short abstract of all the cases published previous to this, says: (1) There are published seven cases, including mine, of real liver cysts. (2) The result of my investigation shows in conformity with other investigations, that the cysts of the liver are produced from the biliary ducts. (3) My case shows, besides the cysts, a great mass of connective tissue; also we find connective tissue in all the cystic livers; it is of only secondary importance.

Primary Tuberculosis of the Liver. Louis Frank. (*Jour. Path. and Bact.,* June, 1902.)

Frank reports a case from which he draws the following conclusions: That primary tuberculosis, though rare, may occur. That the infection may take place by way of the intestines, and portal circulation, the bacilli finding entrance through an ulcer in the bowel and leaving no trace of the place of entrance; that tuberculosis of the liver may extend to other abdominal viscera and to the peritoneum; that the disease causes a great increase of connective tissue in the liver (interstitial hepatitis). It results fatally within twelve months.

Focal Necrosis in the Liver in a Case of Early Typhoid Fever. E. E. Glynn. (*Liverpool Med. and Chir. Journal,* March, 1902.)

The author describes the case as follows:

On microscopic examination the liver contained numerous areas of "focal necrosis," a lesion described by Reed, Legry, Longridge and others. The necrosis areas which were as a rule a little larger than the glomerulus of a human kidney were mainly composed of disintegrated hepatic cells and consisted of a finely granular matrix containing many shrunken, irregular nuclei and a few small round cells resembling at first sight a miliary abscess. It is difficult to ascertain the exact position of these necrotic areas, but they appear to be most numerous at the periphery and in the center of the lobule.

The author calls attention to the observation of Osler that focal necrosis is a common phenomenon in typhoid fever that it is especially an early phenomenon and that sometimes it disappears before the disappearance of the disease. It is a toxemia phenomenon and in this case bore no relation to the typhoid bacilli in the capillaries of the liver.

Pericarditic Pseudo-Cirrhosis of the Liver. J. B. Herrick. (*Trans. Chicago Path. Soc.,* Vol. V., No. 5.)

The author reports two cases, one in which there was an autopsy and one which is still living. In the first case the post-mortem findings were: chronic hyperplastic tuberculous pleurisy; chronic deforming mediastinitis; obliteration and calcification of the pericardium; tuberculosis of the tracheo-bronchial lymph glands, and of the lung, spleen and liver; cardiac cirrhosis of the liver with nodular hyperplastic fibrous hepatitis.

Empyema of the Gall-Bladder. D. N. Eisendrath. (*Trans. Chicago Path. Society,* Vol. IV.)

The author reports a case that occurred in a girl 17 years of age. Seven gall-stones and a large amount of pus containing the colon bacillus in pure culture were evacuated. Patient died within 48 hours. The autopsy showed a gall-stone impacted in the opening of the cystic duct and a plug of mucus in the duodenal orifice of the common duct.

Carcinoma of the Liver. Wells. (*Trans. Chicago Path. Society,* Vol. V., No. 1.)

The author reports a primary carcinoma of the liver with extensive atrophic cirrhosis as written of by Hanot some years ago.

Report of a Case of Diffuse Infiltrating Sarcoma of the Liver with widely Scattered Metastatic Tumors, Secondary to a Sarcoma of the Eye. E. R. LeCount. (*Trans. Chicago Path. Society,* Vol. IV.)

Metastatic sarcomata of the lungs, heart (pericardium), pancreas, liver, thyroid; cervical, mediastinal and retroperitoneal lymphatic glands; mesentery, and the mucous

coats of the esophagus, stomach, gall-bladder and intestines.

The author refers to Rolleston, who has reported a case and summarized 36 cases of melanotic sarcoma of the liver that he was able to find in the literature. Of these the primary tumor occurred in the eye 24 times.

A Case of Primary Colloid Cancer of the Gall-Bladder. A. A. Treutlein. (*Centralb. f. Path u. path. Anat.,* No. 20, 1901.)

This was a case of colloid carcinoma of the gall-bladder and liver, associated with gall-stones. Microscopically he found jelly-like masses in slightly concentric layers, with or without centrally situated cell stars, with illy defined swollen glassy cell bodies and one or several nuclei. Again there were diffusely infiltrated cancer cells, with well defined glassy cell bodies, containing one nucleus squeezed to the wall, looking like a flat platter. By this, colloid may be differentiated from carcinoma muciparum, in which there are cystic dilated cavities, lined with cylindrical epithelium and centrally located jelly masses.

That in this case, the gall-bladder was the primary seat of the disease, could be concluded from: 1st, the general opinion of authors, that the liver only secondarily becomes infiltrated with cancer from other organs, and 2nd, that the diseased process was much farther advanced in the gall-bladder than in other places. The walls of the gall-bladder are entirely infiltrated, and this infiltration of gelatinous material is most marked in the inner zone of the wall, whilst the liver is affected only here and there. Furthermore, there is no record of a case of primary colloid carcinoma of the liver. In relation to the etiology, it may be mentioned that gall-stones were present, a predisposing cause according to many authors. Out of 108 cases of primary cancer of the gall-bladder, 72.3 per cent were of scirrhus variety, 19.5 per cent medullary, while colloid cancer was present in only 8.3 per cent. Gall-stones were present in 91.7 per cent of the cases.

Some Points in the Formation of the Connective Tissue

of the Liver, with Special Reference to Hepatic Cirrhosis. John McIntyre. (*Glasgow Med. Journal,* June, 1901.)

As a result of 500 postmortem examinations, the author concludes that we can speak of cirrhosis as, *primary,* a type being cirrhosis from congenital absence of bile duct, and *secondary,* a type of which is the lesion in acute yellow atrophy. But even in these extreme cases there is probably some admixture—the one is mainly primary, and the other mainly secondary, and so on. In the other less definite lesions these are mingled in varying degrees. The varying factors—loss of tissue tension, irritants of interstitial substances alone, irritants of parenchyma, which act also as stimulants to the fibrous stroma—operate so that we may speak of a cirrhosis which is neither primary nor secondary, but simultaneous with parenchymal necrosis.

The Influence of Bile on Metabolism. E. P. Joslin. (*Journal Exper. Medicine,* 1901, P. 531.)

The author had under observation a woman who was operated on for gall-stones. The operation consisted in drainage, and no bile escaped into the intestines subsequent to the operation. The urine and stools were systematically examined quantitatively for nitrogen and fats. Three months later the stones were removed from the common duct, the fistula was closed and the experiments discontinued three days after the second operation. Similar experiments were done on dogs. The author concludes:

1. That when bile is given by the mouth in pill form it increases the digestion of fats.
2. When there is much fat in the food the administration of bile will increase the proteid digestion, the method being by emulsification of the fat and in that way exposing the proteids to the digestive juice.
3. Ox bile is a cholagogue.
4. As to the general effect of bile on body metabolism, it was noticed that it increased the excretion of both urea and nitrogen.
5. During the administration of bile the urine was increased more than 50 per cent.

Some Experiments on the Intermediary Circulation of the Bile Acids. A Contribution to Our Knowledge of Icterus. A. C. Croftan. (*Am. Jour. Med. Sci.*, Jan., 1902.)

"From the bile acid findings in any case we are no longer justified in categorically asserting or denying the existence of pure hematogenous icterus, nor are we aided by these findings in formulating any definite diagnostic conclusions in regard to the participation of the liver or its ducts in any disease process complicated by icterus."

Carcinoma of the Head of the Pancreas. Billings. (*Trans. Chicago Path. Society,* Vol. V., No. 4.)

In this case there was pressure on the ducts causing retention of bile in the gall-bladder, ducts and liver, and cystic dilatation of the pancreatic duct; yet there was no fat necrosis. There was probably auto-digestion of the pancreas. There was no record of examination of the urine for pancreatic ferments as suggested by Opie.

A Case of Cirrhosis of the Liver and of the Pancreas, with Diabetes and Hemochromatosis. A. P. Condon. (*Trans. Chicago Path. Society,* Vol. IV.)

The author reports a case in which the autopsy revealed the following: The connective tissue of the liver and pancreas was greatly increased and all the viscera were pigmented with a substance that gave the iron reaction. The liver contained the largest quantity of pigment, the other organs presenting discoloration in the following order: pancreas, heart, spleen, kidneys, lungs. Regarding the theories of the etiology of bronzing diabetes, the author gives the following:

1. It is a distinct pathologic entity. This idea was advanced by Marie, and supported by Hanot and other French writers.

2. It is a diabetes mellitus, the diabetic poison producing the hemachromatosis, cirrhosis of the liver, pancreas, etc.—the idea advanced by Leutelle.

3. The hemochromatosis is the primary affection, and the deposition of pigment causes the hypertrophic cirrhosis of the liver and pancreas, diabetes resulting when the pan-

creatitis reached a certain stage—the idea advanced by Opie.

Etiology of Acute Hemorrhagic Pancreatitis. E. L. Opie. (*Johns Hopkins Bulletin,* Vol. XII.)

The author collected 32 cases. In 8, gall-stones were found near the orifice of the common duct; 21 showed that stones had recently been there. In 7 death ensued in 48 hours and the lesion was hemorrhagic pancreatitis. In 17 death ensued in from 7 days to 4 months and the lesion found was gangrenous pancreatitis. The question arises, can gangrenous pancreatitis be a later form of hemorrhagic pancreatitis?

The author believes that there is a relationship between gall-stones and pancreatitis. He reports the autopsy of the case quoted below from Halsted. He describes a small stone in the ampulla 4 mm. above the orifice. The pancreatic duct was stained green with bile.

The striking statement in the histologic report is that the islands of Langerhans were well preserved. Bacteriologic examinations were negative. He reasons that a small stone in the ampulla would convert the bile and pancreatic ducts into a common duct; that a large stone would occlude both ducts. There is an anatomic study of the duodenum and its ducts. He caused the injection of bile into the pancreatic ducts of animals and fat necrosis resulted.

Retro-Injection of Bile Into the Pancreas, Causing an Acute Hemorrhagic Pancreatitis. W. S. Halsted. (*Johns Hopkins Hosp. Bulletin,* Vol. XII, Nos. 121-123.)

The author reports a case that gave an intermittent history of gall-stones. In the present attack in addition to the gall-stone symptoms there were two striking phenomena. The one was a quite general cyanosis showing very plainly in the epigastrium; and the other, a feeling of mental uneasiness. The examination showed fat-necrosis. No stone was found. The patient died. The pathologic report of this case is furnished by Opie. The author concludes that the disease is rare because: the stone must be small enough not to close the pancreatic duct, and large

enough not to obstruct the papilla; the papillary orifice must be narrow; a single stone must be present as several would break the force of the bile.

He believes that the fat-necrosis is largely due to the effect of bile on the pancreatic duct.

The Causes and Varieties of Chronic Interstitial Pancreatitis. E. L. Opie. (*Am. Jour. Med. Sciences.* May, 1902.)

Chronic interstitial pancreatitis is slightly more frequent in males than in females. Two-thirds of the total number of cases occur between the ages of 40 and 60 years.

The most frequent cause of chronic pancreatitis is obstruction of the duct of Wirsung, due to pancreatic calculi, to biliary calculi in the terminal part of the common duct, or to carcinoma invading the head or body of the gland. Duct obstruction may be followed by the invasion of bacteria, which take part in the production of the resulting lesion. Ascending infection of the unobstructed duct may follow an acute lesion of the duodenum or of the bile passages and may cause chronic inflammation. In cases which have given a history of long persistent vomiting, chronic diffuse pancreatitis may be found at autopsy and is probably the result of an ascending infection of the gland.

General or local tuberculosis is occasionally accompanied by chronic diffuse pancreatitis, affecting chiefly the interstitial tissue of the gland. Chronic interstitial pancreatitis is not infrequently dependent upon the same etiologic factors, notably alcohol, which produces cirrhosis of the liver, and in about one-fourth of the cases the two lesions are associated.

Following duct obstruction and ascending infection the lesion affects principally the interlobular tissue, only secondarily invading the lobular tissue and sparing the islands of Langerhans. Diabetes results only when the lesion is far advanced.

Accompanying the so-called atrophic or Laennec's cirrhosis of the liver, the pancreas is at times the seat of a diffuse chronic inflammation, characterized by diffuse pro-

liferation of the interacinar tissue, which invades the islands of Langerhans. A similar lesion accompanies hyaline degeneration of the islands of Langerhans and the condition known as hemochromatosis.

Interacinar pancreatitis is usually accompanied by diabetes mellitus. When diabetes is absent the lesion is of such slight intensity that the islands of Langerhans are little implicated.

Diabetes and Islands of Langerhans. Herzog. (*Trans. Chicago Path. Society,* Vol. V., No. 2.)

The author quotes Opie (*Jour. Experimental Medicine,* 1901, Vol. V.) as having found hyaline material in the islands, especially toward the periphery, and thinking this hyaline material of epithelial origin. He reports four cases. No. 1 showed interlobular intra-acinar connective tissue increased. The epithelium showed degeneration. The islands of Langerhans showed great thickening of the capsule, condensation of the protoplasm and loss of staining power in the nucleus. No. 2 had the same changes in the general connective tissue, in the parenchymatous epithelium and in the islands, only in a much more advanced stage. No. 3 showed a moderate general connective tissue increase. There are, however, hyaline changes in some of the islands. No. 4, there was moderate increase in the general connective tissue. The islands were few, but those that were found were nearly normal.

Interstitial Pancreatitis. Islands of Langerhans in a Diabetic. J. D. Steele. (*Am. Jour. Med. Sciences,* July, 1902.)

The author collected 35 cases of diabetes with histologic studies of the pancreas. He divides them into four groups.

1. Atrophy confined to, or greater in the islands, 24 cases.
2. Hyaline degeneration of the islands, 6 cases.
3. Chronic interstitial pancreatitis with secondary and late involvement of the islands, 4 cases.
4. Acute necrotic destruction of the organ involving the islands, 1 case.

He reports one case with overgrowth of fibrous tissue between the acini and between the lobules. Marked parenchymatous degeneration and disintegration. There was growth of fibrous tissue between the cells of the islands of Langerhans but no marked degenerative changes in the cells. There was no hyaline degeneration as noted by Opie, nor fat droplets as described by Weichselbaum and Stangl. The islands were decreased in number and size.

The author concludes that the case was originally interlobular pancreatitis, later becoming interacinar and involving the islands of Langerhans.

The Relation of Diabetes Mellitus to Diseases of the Pancreas. Hyaline Degeneration of the Islands of Langerhans. E. L. Opie. (*Journal Experimental Medicine,* Vol. V., March 25, 1901.)

The author observes that the islands of Langerhans have functions differing from the functions of the remainder of the pancreas, the ducts do not penetrate into the islands, and the surrounding capillary network is suggestive of the ductless glands. He believes that they have to do with starch and sugar transformations, because feeding considerable quantities of carbohydrates makes the cells more granular. In the chronic interstitial pancreatitis in dogs after ligation of the ducts, there is no glycosuria and the islands are found preserved.

He next discusses the different varieties of pancreatitis. The chief interest of the report pertains to the finding of hyaline masses in the areas corresponding to the islands of Langerhans. In cases of diabetes this hyaline material stained with acid stains. It did not give the amyloid reaction. It did not stain with Weigert's fibrin method. It stained with picric acid as does colloid derived from epithelium, according to Ernst, but did not stain with acid fuchsin as does hyaline derived from connective tissue, according to Lubarsch. He therefore concludes that the hyaline is of epithelial origin.

His conclusion is that while, not all cases of diabetes show pancreatic disease, and not all cases of pancreatic

disease show diabetes, nevertheless there is an etiologic relation between the islands of Langerhans and diabetes.

Degeneration of the Islands of Langerhans in Diabetes Mellitus. Wright and Joslin. (*Jour. Medical Research,* June, 1901.)

The authors found changes in the islands of Langerhans in two out of nine cases of diabetes mellitus.

Interstitial Pancreatitis in Congenital Syphilis. A. P. Condon. (*Trans. Chicago Path. Society,* Vol. IV., Page 200.)

The author reports the case of a child delivered at the eighth month of gestation and living but a few minutes. At the autopsy there was found great increase in the connective tissue of the pancreas. It had compressed the lobules and in some places had caused them to disappear almost entirely.

Does the Pancreas Secrete a Sugar-Splitting Enzyme? Herzog. (*Trans. Chicago Path. Society,* Vol. V., No. 3.)

In this article the writer has considered in extenso the subject of the relation of sugars to each other and arrives at the conclusion that the pancreas, and perhaps the islands of Langerhans secrete the sugar-splitting enzyme.

Report of Four Cases of Fat Necrosis in Connection with Gall-Stones. W. A. Evans. (*Journal Am. Med. Assoc.,* Nov., 1901.)

This is a report of four cases of fat necrosis associated with gall-stones. One of the cases was operated upon, the peritoneum being opened and a few necrotic areas excised for microscopic examination. The patient recovered. Gall-stones were recovered from the bowel movements. In another case the necrosis was very extensive, involving the fat in the peritoneum, in the abdominal wall and the perirenal fat. The patient had multiple gall-stone attacks and passed a stone which was recovered from the feces at the beginning of this attack. At the postmortem no stone was found in the common duct nor in the pancreatic duct. A large number were found in the gall-bladder.

The third case was a case of hypertrophic cirrhosis, mul-

tiple stones in the gall-bladder, none in the ducts. Necrosis was not extensive.

The fourth case showed an extensive necrosis with gall-stones. The duodenum, stomach, liver, pancreas and ducts were removed together and opened up carefully.

Annular Pancreas. Theo. Tieken. (*American Medicine,* Nov. 23, 1901.)

A case of true annular pancreas, causing constriction of the duodenum with sacculation of the intestines above the narrowed portion, dilatation and hypertrophy of the pylorus and hypertrophy of the wall of the stomach. The author has found four similar cases on record.

Adrenalin Glycosuria and other Forms due to the Action of Reducing Substances and other Poisons on the Cells of the Pancreas. C. A. Herter. (*American Medicine,* May 10, 1901.)

The author has experimented on animals and has come to the following conclusions:

The greatest effect is caused by the intraperitoneal injection given in as concentrated a form as possible.

Duration of the glycosuria is usually less than 24 hours. Total quantity of sugar usually not more than a few grams.

Application of the adrenalin directly to the pancreas causes a much greater glycosuria and for this reason it is taken that the greater action of the intraperitoneal injection is due to the direct contact with the pancreas.

Glycosuria is probably due to a disturbance in the normal balance between the oxidizing activities of the pancreatic cells and the production of reducing substances in other parts of the organism.

Malignant Tumor of the Pancreas. Chas. Workman. (*Glasgow Medical Journal,* May, 1902.)

This is a report of two malignant tumors of the pancreas. In the first the histologic findings were rather peculiar. It was diagnosed by the author as myeloid sarcoma. In the second the diagnosis of carcinoma was made.

Sarcoma of the Pancreas. George A. Boyd. (*Trans. Chicago Path. Society,* Vol. IV.)

The author reports a case. There were some adhesions to the neighboring organs, but no metastases. The absorption of the toxins had produced a chronic splenitis and changes in the liver, partly parenchymatous and partly indicative of early interstitial cirrhosis. A review of the literature to date is given.

THE NERVOUS SYSTEM.

Three Gliomata of Ependymal Origin, One Over the Coccyx. Mallory. (*Journal of Med. Research,* June, 1902.)

The author coincides with Weigert's description of the granules found only in ependymal cells, namely, small clumps of dots and rods often lying in a lighter staining area, and staining with phosphotungstic acid hematein. The most interesting of the three specimens was a, probably, congenital tumor, the size of a baseball, located over the coccyx of a woman forty-four years old. The diagnosis was made on the ground of fibrils, and the cell bodies noted above.

Pathology of a Case of Polio-Encephalomyelitis. Alice Hamilton. (*Journal of Medical Research,* June, 1902.)

This is a report of a case terminated by death in about five days. At the autopsy nothing was to be seen with the naked eye. Microscopically, she found engorgement of the blood vessels, perivascular cellular infiltration, most marked in the grey matter, and degeneration of the multipolar cells of the anterior horns, and of the cells of the sixth and seventh nerves.

The Causation of Paralysis in Diphtheria. A. C. R. Foulerton. (*Edinburgh Med. Jour.,* Jan., 1902.)

The author concludes that in some cases a descending affection of the neuron occurs, beginning in the motor ganglia. In other cases, in common palate paralysis,

for instance, we have a concentration of the poisons at the seat of formation, and consequently primary peripheral changes.

The Pathology of Post-Diphtheric Paralysis. E. E. Las- (*Jour. Path. and Bact.*, June, 1902.)

The spinal cord shows slight degenerative changes in the cells of the posterior cornua, extending in some cases through the posterior roots to the anterior cornua. In no case was there any upward degeneration of the posterior columns.

The chief lesion is a marked degeneration of the peripheral nerves. The muscles involved in the paralysis also show some fatty degeneration. The parenchymatous degeneration of the nerve fibers must be regarded as the primary lesion.

Phrenic Nerve Injuries. W. E. Schroeder and F. R. Green. (*Am. Jour. Med. Sciences,* Feb., 1902.)

The authors call attention to the accepted opinion that division of the phrenic nerve is fatal. They announce their lack of belief in this opinion. They relate the history of a man with a tumor in the neck involving the phrenic nerve. In removing the tumor they severed the nerve, subsequently reuniting the fourth root and leaving the fifth ununited. The man had no bad results follow, whereupon they instituted a series of experiments. These consisted of the systematic pinching of the nerve in every case where, in operative procedure, the nerve was exposed, and by cutting the nerve in 10 dogs.

Section of the nerve did not produce immediate disturbances of respiration of a grave character. Dogs lived for as much as 14 days after section of the nerve and showed degeneration of the muscle and hyperplasia of the connective tissue of the diaphragm. This did not hold true, however, around the margin for a distance of ¼ to 3-8 of an inch from its costal attachment. Here the muscle had retained its healthy appearance.

The authors concluded that this portion of the diaphragm was supplied by the intercostal nerves. They fol-

lowed this by a very valuable anatomic study, especially as relates to the nerve supply of the diaphragm and compiled a bibliography including 59 references.

They arrive at the following conclusions:

1. That the diaphragm is not an essential muscle of respiration.

2. That the symptoms commonly described as due to injuries to the phrenic nerve are due to some other cause.

3. That while the diaphragm is innervated by branches from the intercostal nerves, this supply is minor in importance.

4. That division of the phrenic nerve by producing a partial collapse of the lower lobe of the lung on that side and an atrophy of that half of the diaphragm, might predispose to an infection or might be followed by a diaphragmatic hernia.

5. That division of one phrenic nerve in man followed by paralysis of one-half of the diaphragm is not necessarily fatal. (The anatomic points of this paper are considered in the section on anatomy.)

The Pathogenesis of Tabes and Allied Conditions in the Cord. C. Watson.

After studying the histologic changes in the cord and in various animals the author comes to the conclusion that tabes is of vascular origin, and it is probable that the chief infection occurs in the intestines.

The lesion may be described as dilated perivascular lymphatic spaces. The capillaries are much thickened. The large number of amyloid bodies seen throughout the field are probably significant of a long continued toxic action on the cells in question.

The author is plainly of the opinion that these scleroses are primarily due to toxemias, and the probable seat of the poisonous formation is in the gastrointestinal tract. It is his belief that the crises are expressions of temporary toxemias and suggests that the blood before, during, and after the crises, be examined.

A Periendothelioma of the Dura Mater Involving the

Cranial Nerves. D. R. Brower and H. G. Well. (*Trans. Chicago Path. Soc.,* Vol. IV., 1901.)

The authors report the case of a tumor in contact with the pons internally and impinging on the anterior half of the medulla. It involved the cranial nerves from the 5th to the 12th, inclusive.

It was of slow growth, extending over many years, and there were no pressure symptoms. From the pathologic study, syphilis was excluded from its pathogenesis, although the patient was probably syphilitic.

The authors conclude that it is a benign growth of the dura mater, derived from the endothelium of the lymphatics of the perithelial layers of the blood vessels, the perithelioma of Borrmann. As special structural features may be mentioned, the presence of many uninuclear and multinuclear giant cells and spicules of true bone.

The Pathology of Disseminated Sclerosis. A. F. Shoyer. (*Journal Path. and Bacteriology,* March, 1902.)

The distribution of the lesions of disseminated sclerosis can be explained by the assumption that they are caused by a poisonous agent conveyed by the cerebro-spinal fluid, which finds entry along the fissures from the central canal and ventricles, and along the nerve roots; also at a point at each lateral margin of the cord.

Microscopic appearances. The histologic characters of the patches are quite consistent with the assumption that they have been formed by the advancing wave of diseased cerebro-spinal fluid, gradually penetrating directly into the nervous tissue. The first effects of the poison or toxin are seen at the periphery of a patch. The neuroglia suffers first, the cells increase in number, the cell body becomes longer and the processes more numerous and more branched. Further towards the center of a patch other changes are taking place, the medullary sheaths of the nerve fibers may be seen to be swollen and distorted and no longer take up the yellowish color of the picric acid in the Van Giesen stain, and still nearer the center they have

become disintegrated and the axis cylinders are left without cover and also become swollen.

Meanwhile the neuroglia cells have undergone further changes. They have lost their processes and have become large, round or oval cells, loaded with the fatty debris of the medullary sheaths. In this condition they have been described as "granule cells." Their discarded processes form a dense fibrous tissue, in which the granules, cells, and axis cylinders lie.

Great numbers of the granule cells are seen lying about the blood vessels and in the lymphatic sheaths in such a way as to make it probable that they are acting as scavenger cells and carrying their fatty contents to the vessels, there to discharge them into the lymph stream.

In the center of an old patch the blood vessels are surrounded by clusters of nuclei, which probably represent the granule cells after they have discharged the fat and have become once more connective tissue cells.

THE GENITO-URINARY SYSTEM.

Malaria Infection with Massing of the Parasites on the Kidney. James Ewing. (*Am. Jour. Med. Sciences,* Oct., 1901.)

The author's conclusions are that there are three varieties of albuminuria due to malaria.

1. There is the acute degenerative type of toxic origin which results in albumin in the urine.

2. In extreme forms of degeneration with focal necrosis there are numerous hemorrhages and exudation into the tubules of blood serum and blood pigment. He thinks this the origin of malarial hemoglobinuria.

3. Massing of the parasites in the renal capillaries with extensive degeneration of the parenchymal cells and multiple hemorrhages, and exudation of blood serum into the tubules.

Fatty Transformation of the Kidney. S. Dahl. (*Trans. Chicago Path. Society,* Vol. V., No. 1, 1901.)

The author reports a case of almost complete fatty transformation of the kidney subsequent to chronic suppurative nephritis. The pelvis of the kidney was occupied by renal stones. There was a little kidney stroma remaining. This showed interstitial changes.

A Case of Hydro-Pyonephrosis. B. Rank. (*Archiv f. pathol. Anat.,* Bd. 164, 1901.)

The author describes a contracted kidney, where he found besides arterio-sclerosis and inflammation, especially marked hydro-pyonephrosis. The hydro-nephrosis had become a pyonephrosis. The process came to a standstill and calcification took place in the hilum.

The Origin of Cystic Kidney. Strede. (*Centralb. f. allg. Path. u. path. Anat.,* 1901, No. 13.)

This article is the result of a study of a case of double cystic kidney. The author concludes that the cysts are retention cysts; that the retention is due to hyperplasia of connective tissue and contraction, thereby disturbing the balance of blood and lymph flow, and obliterating the tubules. The hyperplasia of connective tissue he thinks probably due to a preceding inflammation, usually starting in the pelvis and spreading to the pyramids.

Double Ureter from the Right Kidney. C. L. Scudder. (*Am. Jour. Medical Sciences,* July, 1901.)

The author reports a case and says there are nine similar cases on record.

[The editor has seen a case of double ureter on each side. Each ureter was pervious from the pelvis of the kidney to the bladder.]

Malformation of the Kidney. G. A. Rorie. (*British Med. Journal,* April 27, 1901.)

This is a description of a case in which the right kidney weighed only 18 grains, but still carried on its function. It was about the size of a bean and on histologic examination contained apparently normal kidney tissue.

Observation on the Character of the Cells in the Exudate in Acute Interstitial Nephritis, with Special Reference to the Presence of Cells with Eosinophilic Granula-

tions. W. T. Howard (*Am. Jour. Med. Sci.,* Feb., 1901.)

The following cells are found: Plasma cells, lymphocytes and polymorphonuclear leucocytes.

Lymphocytic and plasma cells are found in the dilated vessels. Mitosis and evident ameboid activity of plasma cells in both blood vessels and tissue.

Also large numbers of typical eosinophilic leucocytes are found, both in the exudate and in the blood vessels. These are for the most part brought in by blood vessels, but there is evidence that they may be formed locally from plasma cells.

The cells are derived from the blood vessels—emigration, proliferation of the vascular endothelium, and from fixed connective tissue cells. The lesions may be either diffuse or focal.

Etiology. Bacteria play no part. No adequate explanation has been offered for the focal lesions. Councilman thinks that physical conditions of the circulation may be concerned in the accumulation of cells in certain places, and that the interstitial foci may be due to the presence of soluble substances exciting a positive chemotaxis for the cells. He says: "We cannot lay any weight on the presence of bacteria in the kidney as a constant factor in acute interstitial lesions."

The Pathology and Bacteriology of Uretero-Intestinal Anastamosis. F. Robert Zeit. (*Trans. Chicago Path. Society,* Vol. IV.)

The cases upon which this report is based include the various operations done by Franklin H. Martin and Reuben Peterson on 141 dogs.

The author comes to the following conclusions:

1. Ureteral implantation into the rectum is always followed by ascending infection. The resulting pyelonephritis is caused by the bacillus coli communis.

2. The primary mortality is very large, 84 per cent, no matter which operation is done.

3. Of the 120 dogs operated upon, 90 died of peritonitis

due to leakage of urine, or general sepsis, and pyelonephritis during the first ten days.

4. Dogs living a longer time died of pyelonephritis, pyelonephrosis and pyemia.

5. Dogs which had fully recovered from the operation and the resulting pyelonephritis, and were, to all appearances, in perfect health and vigor again, all had granular contracted kidneys, due to induration and cicatrization of diseased areas. The rectum as a substitute for the bladder in such cases acts fairly well.

6. Dogs which had fully recovered after unilateral implantation, were living by the other kidney. The kidney of the side operated on was atrophic, and granular, the result of pyelonephritis. The functionally active kidney was of two to eight times the size of the atrophic one.

7. A review of the literature on uretero-intestinal anastamosis in man, shows that no better results can be expected than in animal experiments.

8. The ureters are frequently dilated but show very little or no disease, no matter how extensive a pyelitis, or pyelonephritis is present.

9. The bladder is always infected by way of the urethra, whether it is emptied at the time of operation or not. A purulent cystitis was found in every case, caused by the staphylococcus albus, and bacillus coli communis.

10. Artificial immunity to infection by the so-called colon group of bacteria is the only hope of making ureterointestinal anastamosis a feasible operation.

Pathology of the Imperfectly Descended Testis. W. M. Eccles. (*British Med. Journal,* March 8, 1902.)

The author states that inflammation of the imperfectly descended testis may be due to traumatism, extension of the inflammation from the urethra, secondary, in certain cases of parotitis, in all of which the inflammation is of an acute character.

It will be of a chronic nature when due to deposit of tubercle bacilli or syphilitic infection.

Tuberculosis of the Testicle. Thorndike. (*Boston Med. and Surgical Journal,* July 3, 1902.)

This is a study of 75 cases. Previous urinary symptoms were absent in 59 of these cases, present in 9 cases. Examination of the lungs negative in 23 cases, positive in 13 cases. Epididymis alone involved in 42. Substance of the testicle involved in 32 cases. Vas deferens involved in 12 cases. Rectal examination showed seminal vesicles involved in 16 cases. Prostate involved in 13 cases. Prostate negative in 13 cases.

The author does not believe that it is often advisable to remove the epididymis and leave the testicle. He does not believe that the disease spreads by way of the vas deferens.

Biologic Test for Semen. C. F. Farnum. (*Trans. Chicago Path. Society,* Vol. V., No. 3.)

The author confirms the specific character of this reaction. He found that the serum of rabbits that had been injected with dog's spermatic fluid reacted with the spermatic fluids of dogs but with no other. He did not determine whether injection with spermatic fluid produced a rabbit serum which would react with dog's blood as it did with dog's semen.

He repeated the experiments with bull's semen and with human semen and he arrives at the conclusion that the reaction is certain enough to give it medico-legal value.

In the discussion Leo Loeb told of some experimental work on animals injected with spermatazoa that is of interest, in view of the recently reported explanations of fertilization on the ground of specific bodies.

Angio-Sclerotic Ulceration of Cervix Uteri and Vagina. A. C. Gillam. (*Trans. Chicago Path. Society,* Vol. IV.)

Report of a case which was probably due to a syphilitic angio-sclerosis, but which was associated with carcinoma in other parts of the body. It was thought to be due to the carcinoma, but carcinoma was ruled out by histologic examination.

Primary Carcinoma of the Urethra in Women. H. N. Vineberg. (*Am. Jour. Med. Sciences,* July, 1902.)

Author refers to 27 cases collected by Ehrendorfer in 1899 (*Archiv f. Gyn. Bd. LVIII., Heft 3.*) and adds eight cases, including the one seen by himself. He divides these cases into those that originate in the urethral mucous membrane or glandular structures, and those that are vulvo-urethral in origin.

Of the first variety there were seven cases in Ehrendorfer's collection and three in Vineberg's, 10 in all. The figures for the second are 20 and 5, respectively.

Cases cited are those of McGill (*London Lancet,* 1890, p. 966), Kynoch (*British Med. Journal,* 1901, Vol. 1), Landelin (*Centralblatt f. die Krankeiten der Harn u. Geschlechtsorgane,* 1900), Orthman (*Zeitschrift f. Geb. und Gyn.,* 1901, Bd. XIV.), Goffe (*New York Medical Record,* July 6, 1901), C. J. Miller (*Am. Gynaecol. and Obstet. Jour.,* Nov., 1901) and A. Brothers (*Am. Jour. of Obstetrics,* Jan., 1902.)

Squamous Cell Carcinoma of the Body of the Uterus. Findley. (*Trans. Chicago Path. Society,* June, 1902.)

This is a report of a case of adeno-carcinoma, and squamous-celled carcinoma in the same specimen. The author sugests a possibility that the squamous areas may be due to pressure from a fibroid.

Anatomy and Etiology of Tubal Pregnancy. L. Aschoff. (*Centralb. f. all. Path. u. path. Anat.,* 1901, Nos. 11 and 12.)

This study first considers the histology of tubal pregnancy. This brings out the inadequate mucous membrane hyperplasia of the tube wall, the penetrating capacities of the structures of the villi, the placental site as the point of rupture and the insinuating powers of the fetal structures, rather than mechanical stretching, as a cause of rupture, of hemorrhage, and of tubal abortion. The ovum usually settles in the inner two-thirds of the tube.

Spontaneous Amputation of Both Fallopian Tubes. Emil Ries. (*Trans. Chicago Path. Society,* Vol. IV.)

The author reports a case in which both tubes were amputated spontaneously, the right stump containing a pus sac the size of a goose-egg. The woman had had one child and two miscarriages. The author thinks the amputations were probably due to peritoneal adhesions.

The Question of Ovarian Pregnancy. J. C. Webster. (*Trans. Chicago Path. Society,* Vol. V., No. 1.)

The author critically reviews a study made by Catherine Van Tussenbroek and reported to the Third International Congress of Gynecology and Obstetrics held in Amsterdam in 1899.

As a result of this study she had concluded that ovarian pregnancy was possible. The conclusion arrived at by Webster, is that she has not finally proved this possibility, and he is not yet ready to abandon the idea that impregnation must occur in some part of Müller's duct.

The finding of a fetus in the Graafian follicle does not prove that it had not been impregnated elsewhere. He does not think that her search for decidual cells was complete enough. The question of parthenogenesis is lightly touched on. In the discussion by Leo Loeb reference is made to observations of segmentation of the ovum within the Graafian follicles.

SKIN; BONES; MUSCLES; JOINTS.

About Osteotabes Infantum and Rickets. Ernst Ziegler. (*Centralblatt f. allg. Path. u. path. Anat.,* No. 21, 1901.)

In order to understand the condition, it is necessary to look upon bone marrow of children as composed of two ingredients: (1), the lymphoid, or as the author likes better, splenoid marrow, and (2), a tissue of fine fibers, which appears in the larger marrow spaces and in the spongy tissue on the surface of osseous spiculæ; it also occupies all the room between the vessels and osseous substance, in the small subperiosteal nutrient canals of the cortex. This tissue, which contains osteoblasts and osteoclasts at time of growth of bone, he calls internal perios-

teum, or endosteum, and he separates it from the real marrow tissue.

Osteotabes infantum, which begins at the same ages as rickets, is a disease due to changes in splenoid marrow. This marrow shows an atrophy of free cells in patches in the bones of the skull and in the long bones. In long bones the marrow of the diaphysis, as well as the Haversian canals and spongy tissue, are affected (in cranial bones, only marrow spaces), and in some cases the whole marrow may be converted into a jelly-like mass, with a few vessels and star-shaped and spindle-shaped cells, with some supporting tissue, but with only a few free cells.

By osteotabes infantum Ziegler means a trouble of the first year of infancy, characterized first by a peculiar disease of the bone marrow in connection with increasing internal atrophy of bones, as well as insufficient new formation of bone; and secondly, by anemia and hemophilia, due to faulty function of bone marrow. Rickets on the other hand he considers a peculiar disease of the outer and inner periosteum, characterized by a pathologic growth and formation of rich cellular fibrous tissue, in which by metaplastic processes rich osteoid tissue is formed. He does not know of a combination of the two diseases, but does not doubt its possibility, as shown by the examinations of Schmorl and Nauwerck.

Diffuse Osteo-Sarcoma of the Femur. Thevenot. (*Gaz. des Hopitaux,* April 23, 1901.)

The author reports a case of diffuse osteo-sarcoma in the femur in a woman 31 years old. There was no line of demarcation between the tumor and the marrow substance. It had caused a cylindrical dilatation of the entire femur to a very great size.

New Anatomic-Pathologic Study of Myopathic Articular Lesions. H. de Gaulejie. (*Gazette des Hopitaux,* Jan. 31, 1901.)

The conclusions of the author are:

1. In many atrophies, one frequently encounters subluxations.

2. In the generalized amyotrophies there is no bony deformity. The luxations are due to ligamentous changes and the effects of weight. In the partial paralyses, on the contrary, we have bone and joint deformities with thickening of the capsule. The subluxation or luxation is due to the bony deformity.

3. The articular lesions due myopathies constitute an entity.

ORGANS OF SPECIAL SENSE.

Tuberculosis of the Iris. Wm. H. Wilder. (*Trans. Chicago Path. Society,* Vol. IV.)

Tuberculosis of the iris manifests itself in two ways. 1. Solitary tubercle, affecting but one eye and developing as a small, round or oval nodule, usually at the periphery of the lower part of the iris. 2. As disseminated tubercles, which may occur in one or both eyes. The favorite site is at the root or periphery of the iris and they seem to be constantly changing, some disappearing while others are forming. Condylomatous nodules, so frequent in syphilitic iritis are usually seen at the pupillary margin.

Both forms present the same histologic features, namely, the typical tubercle formation around a central giant cell. In the milder forms of the disease, the bacilli are very scarce and difficult to find.

Most of the patients affected with tuberculous iritis have either pulmonary tuberculosis or tuberculous manifestations in other structures, such as joints, lymphatic glands or skin. Some cases, however, appear to be primary.

Psammoma of the Optic Nerve. Earl. (*British Med. Journal,* April 13, 1901.)

The author describes the pathology of the above tumor as follows: The cellular elements of the tumor are principally small, round mononuclear cells. There is very little fibrous connective tissue present. The fibers of the optic nerve can be traced through and over the surface of the

tumor, which lies within the dural sheath of the nerve, except at its posterior part. There are numerous calcified rounded bodies of varying size, all showing more or less distinct lamination. Blood-vessels are most numerous in the parts which contain fewest calcified bodies. There are found, also, numerous masses of a hyaline material which generally contain a few round cells. These can in some places be traced to a hyaline change in the walls of the vessels. The hyaline material is possibly the precursor of the calcified bodies.

The most frequent tumor of the optic nerve is myxoma or myxo-sarcoma.

Glioma of the Retina. Brown Pusey. (*Trans. Chicago Path. Society,* Vol. V., No. 2.)

The author quotes Flexner's article (*Johns Hopkins Bulletin,* 1891, p. 118) also Wintersteiner (*Wiener klin. Woch.,* 1894, No. 27, and Des Neuro-Epithelioma Retinæ, S. 219, 1897.)

He disagrees with their holdings that the cells are rods and cones and suggests the name ependymal glioma of the retina.

LABORATORY DIAGNOSIS.

Method of Staining Blood. Wright. (*Jour. of Medical Research,* Vol. VII., No. 1.)

Make a .5 to 1. per cent solution of sodium bicarbonate in water in an Ehlenmeyer flask and add 1 per cent methylen blue (Grübler Bx, Koch's or Ehrlich's rectified). Be certain that all of the soda is dissolved before the blue is added. Steam in an Arnold sterilizer for a full hour—cool —pour into a large dish or flask and add, shaking considerably, enough 1 to 1000 watery solution eosin (Grübler's yellowish, soluble in water) to make mixture lose blue color, become purple and form a scum with a metallic luster. Looking closely one sees a finely granular precipitate in suspension. This takes about 500 c.c. eosin solution for 100 c.c. alkaline solution. Collect the precipitate on a filter

paper and dry it thereon. When thoroughly dry make a saturated solution of precipitate in pure methyl alcohol; .3 of a gram of dry precipitate will saturate 1000 c.c. of alcohol. Filter and add 25 per cent of methyl alcohol (80 c.c. of solution, 20 c.c. of alcohol). Stop well.

To use:

1. Films of blood dried in air.
2. Cover with stain one minute.
3. Add water to stain on film until mixture becomes semitranslucent and a yellowish metallic scum forms on surface. Leave on 2 or 3 minutes.
4. Wash in water until thin places are yellowish pink.
5. Dry with filter paper.

[The Editor has made use of this as a routine blood stain during several months. In his opinion it is the most reliable and most uniform of all of the blood stains, and in addition is most easy of application. There are several things that he has noted in its use.

In the first place it commonly stains large numbers of small masses of protoplasm that seem to have been free in the blood plasma. These are usually rounded and have the appearance of bodies of neutrophilic leucocytes. The granules are of the same size as those in the neutrophilic leucocytes. They take the same shade of color. It has seemed to him that these bodies are the so-called third corpuscles, hematoblasts of Hayem, or Bizzozero blood plates.

He has noted red granules in the protoplasm of the erythrocytes affected with tertian forms of malaria. These had already been observed by Wright and by McElroy of Mississippi.

Thus far no opportunity has arisen to try this stain on red blood cells infected with estivo-autumnal parasites.

Almost habitually the mononuclear hyaline, especially the large mononuclears contain a few scattered granules; some of these are small and take the same stain as the neutrophiles. Others are larger and take the neutrophilic shade, while still others take the shade of the eosinophilic granules.]

Liquid Air as a Freezing Medium in the Laboratory. W. H. B. Stoddart. (*London Lancet,* May 17, 1902.)

The author comparing this agent with ether concludes that it is much better, the tissue is frozen much quicker, remains frozen much longer and there is no unpleasant odor to it. He gives a description of a microtome and other apparatus.

A Rapid Method of Permanently Mounting Sections made with a Freezing Microtome. J. H. Wright. (*Centralb. f. allg. Path. u. path. Anatomie,* 1901, 634.)

1. Place the piece of tissue in 10 per cent cold formalin for 2 hours, or boiling formalin 2 to 3 minutes.
2. Wash in water.
3. Cut with a freezing microtome (Bardeen's CO_2 attachment is satisfactory).
4. Arrange section on slide.
5. Place a smooth cigarette paper on section. Now a piece of filter paper saturated in 95 per cent alcohol on the cigarette paper. Press down each strip carefully.
6. Cover with absolute alcohol 30 seconds. Drain.
7. Let a very thin celloidin solution in equal parts absolute alcohol and ether flow over section. Drain.
8. Flood in 95 per cent alcohol and then put in water for 10 seconds.
9. Stain and mount, using some oil other than cloves for clearing.

Test for Power of Converting Sugar. Lepine. (*Lyon Médical,* March 3, 1901.)

The author says that in making the test for the converting power of the economy in glycosuria and as a biologic test of the capacity of the liver that we use sugar containing levulose in part or in whole rather than glucose alone. As saccharine is rich in levulose he suggests the use of that agent.

Sugars of the Blood. R. Lepine and Boulard. (*Lyon Médical,* May 5, 1901.)

They conclude that besides glucose we have levulose and maltose in the blood. This explains the discrepancy be-

tween the polariscope readings and the results of Fehling's test. Levulose is strongly (—92) rotary to left. Glucose (+52) and maltose (about + 150) dextrorotary.

The Blood and the Defensive Reactions in Small-Pox. M. E. Weil. (*Gazette des Hopitaux,* June 13, 1901, No. 67.)

The author examined the blood of small-pox patients and arrived at the following conclusions:

1. There is a marked globular destruction and an especially marked hemoglobin destruction.
2. Excess of normoblasts.
3. Leucocytosis. This leucocytic increase is in the mononuclear forms, and especially in the cells of Turck.

He says that this method of examination will serve to differentiate small-pox from other similar skin diseases. Leucocytosis is present in all forms, except in the hemorrhagic form. Here it is but slight.

The Cells of Inflammatory Exudations. An Experimental Research as to their Function and Destiny, and also as to the Origin of the Mono-Nuclear Cells. J. M. Beattie. (*Journal of Pathology and Bacteriology,* June, 1902.)

Beattie made extensive experiments with peritoneal injections of guinea pigs with B. coli, B. typhosus, cholera bacillus, bacillus of dysentery, staphylococcus pyogenes aureus, bacillus tuberculosis, and also with foreign particles. For the most part B. coli was used.

By means of a sterile, capillary pipette, the peritoneal fluid was withdrawn at different periods, following inoculations with various microorganisms. Forty-four guinea pigs were used in the experiments.

After an injection, various cells appear in the exudate. In the early stages, six to forty-eight hours, the exudate is clear, abundant, and contains large numbers of polymorphonuclear leucocytes. In non-fatal cases these diminish gradually after forty-eight to fifty-six hours and disappear entirely after five or six days.

Excepting in leprosy and tuberculosis these polymorpho-

nuclear leucocytes are the main phagocytes. This exception is probably due to the slow growth of these bacilli and consequently a later leucocytosis. It is certain that there is a substance produced by the cells which is injurious to the life and activity of the bacilli, but it is doubtful whether it is produced by these leucocytes or the mononuclear cells.

The activity of bacteria was observed to be impaired before ingestion by the cells. The polymorphonuclear cells are largely destroyed in the peritoneal fluid, either as free cells or in the interior of other cells.

The coarsely granular eosinophile cells play no important part, at any rate in relation to bacteria. The mononucleated phagocytes are found at all stages, being most abundant after thirty-six hours. They are derived from the endothelium of serous membranes, of blood vessels, of lymph vessels and sinuses, large mononuclear leucocytes and from the lymphoid tissue surrounding the vessels. They are ameboid and show marked vacuolation of their protoplasms, which is probably an evidence of their secretory action, and not merely of a degenerative change. They are markedly phagocytic to other cells, as well as to bacteria. These cells are largely destroyed in the peritoneal sac. None of the internal organs, so far as Beattie has been able to ascertain, appear to act as destroyers of, or storehouses for, these cells, except possibly the lymph glands. Great numbers of these cells are always found on the omentum. These mononuclear cells are the most important cells of inflammatory exudates. In cases of peritonitis, the omentum must be looked upon as an important agent in protecting the individual from more general infection.

The presence of a large number of these cells, if active, in inflammatory exudates is a favorable sign.

The plasma cells, which Mallory suggests may produce the antitoxins of typhoid fever, are, he believes, nothing but these mononuclear cells. They can, and do, act as phagocytes, and are not confined to any special form of

inflammation, but are most numerous in cases of bacterial, or toxic, infection.

The Diagnostic Value of the Variations in the Leucocytes and other Blood Changes. Leonard Rogers. (*British Med. Journal,* April 5, 1902.)

The author believes that the percentage of the different forms of leucocytes counted in a stained blood film is of great diagnostic value in differentiating typhoid and malarial remittent fevers and is easily ascertained.

An increase in the lymphocytes to 40 per cent or over, without any increase in the large mononuclears, points to typhoid as against malarial fever. An increase in the large mononuclears to about 12 per cent and upwards, especially during the remissions of the temperature, strongly indicates malaria as against typhoid fever. This change is of great value when parasites are absent from the blood. The presence of myelocytes in any number, such as from 1 to 5 per cent, points to malaria as against typhoid fever.

A high degree of anemia such as a reduction of the red corpuscles to below 3,000,000 per c.mm. is much more frequently met with in malaria than in typhoid.

A very great reduction in the total leucocytic count, such as below 2,000 per c.mm., is much more frequently met with in malaria than in typhoid, while the proportion of white to red corpuscles in malaria is not infrequently less than 1 to 2,000. This is rare in typhoid.

Leucocytosis with a great excess of white corpuscles, upwards of 80 per cent of which are polynuclears, is often of service in excluding malaria in intermittent fever due to liver abscess or other local inflammation.

Cytodiagnosis of Pleural Effusions. G. Lovell Gullard. (*Scottish Med. and Surg. Journal,* June, 1902.)

The cells in tubercular effusions are at first mainly polymorphonuclears, but these have disappeared by the end of the third day. After the third day there are lymphocytes, red blood cells and a few endothelial cells, the lymphocytes comprising about 50 per cent or may be 80 per cent

of the total number. The red cells are usually about 50 per cent.

Pneumococcus and streptococcus effusions. Great preponderance of the polymorphonuclears, unaltered or degenerated as the case may be; often numerous endothelial cells, fresh or degenerated. The more acute the case the more polymorphonuclears and the less endothelial cells.

Edematous effusions. Heart and kidney cases. Cells almost always very few in number and consist mainly of endothelial cells often lying together in clumps.

Malignant pleurisies. Cells of malignant growth will be found in the fluid often in great numbers. They are often swollen, usually larger than any of the ordinary cells found and show abnormalities in the nucleus.

Researches on the Agglutination of the Bacillus of Koch and Cytodiagnosis in 24 Cases of Serofibrinous Effusion in the Pleura. Widal and Ravant. (*Gaz. des Hopitaux,* Aug., 1901.)

The authors call attention to the necessity of having the culture just right. They say the best culture is a bouillon not very thick and 5 to 6 days old. In 11 so-called idiopathic pleurisies which were of tubercular nature, the reaction was positive in 9, doubtful in 1, negative in 1.

In two pleurisies in phthisis there were two negative results. Eleven divers pleurisies of which none were tubercular gave negative results.

On the strength of their work they approve of the test.

The cytodiagnosis of these fluids showed that the 11 idiopathic contained lymphocytes and no endothelial cells. The absence of endothelial cells and an excess of lymphocytes characterize tubercular pleurisies. The 11 non-tubercular fluids contained endothelial cells, polymorphonuclear cells and lymphocytes; the latter being the least abundant.

Technic and Results of Serum Diagnosis of Tuberculosis. Arloing and Courmont. (*Gaz. des Hopitaux,* Aug., 1901.)

They suggest that we make use of proper cultures killed

by formol just as they attain the proper degree of mobility.

The second suggestion is that we consider nothing as a reaction which is not frankly positive—does not give macroscopic agglutination and very clear supernatant fluid.

They report 66 cases of surgical diagnosis. Lesions clinically nontubercular, 11 cases, reaction positive in all. Fifty-five cases clinically tubercular, 41 positive (74.34 per cent) and 14 negative (25.66 per cent).

Cytodiagnosis. Ch. Nicolle. (*Gaz. heb. de Med. et de Chir.,* Aug. 18, 1901.)

The article does little more than quote Widal and Ravant's work. The fluid is defibrinated by shaking in a tube which contains some glass bulbs. It is then centrifuged. Cells are stained with eosin-hematin, Ehrlich's triacid and with Thionin. A fluid containing very few cells is centrifuged without previous removal of the fibrin.

Formula of tubercular pleurisy:
- Abundant lymphocytes.
- Few polymorphonuclears.
- Few endothelial cells.

Formula of pneumococcic pleurisy:
- Few lymphocytes.
- Many polymorphonuclears.
- Few endothelial cells.

Formula of pleuritic effusion, due to heart disease:
- Few lymphocytes.
- Few polymorphonuclears.
- Many endothelial cells.

Formula of tubercular meningitis (Widal, Ravant, Sicard and Griffon):
- Many lymphocytes.
- Few polymorphonuclears.
- Few endothelial cells.

Formula of epidemic meningitis (Monod):
- Few lymphocytes.
- Many polymorphonuclears.
- Few endothelial cells.

Formula of common hydrocele fluid:

Nothing but endothelial cells.

Formula of gonorrheal hydrocele fluid (Tuffier and Milian):

Polymorphonuclears predominate.

Formula of tubercular hydrocele fluid (Widal and Ravant):

Lymphocytes predominate.

The Leucocytic Changes Following Intravenous Injections of Cinnamate of Soda. Shaw. (*Journal Path. and Bacteriology,* March, 1902.)

Injections of cinnamate of soda produced leucocytosis as claimed by Richter and Spiro. The lymphocytes were transformed into polymorphonuclear leucocytes. This did not occur in the spleen since the polymorphonuclears were no more abundant in splenic tissue than elsewhere. Eosinophiles were decreased.

These results seem to sustain Uskow's contention that the lymphocytes eventually change to the granular forms.

Blood Cultures in Pneumonia. Rufus I. Cole. (*Johns Hopkins Hospital Bulletin,* June, 1902.)

The author found pneumonia organisms in the blood of 9 cases, all of which ended fatally. He failed to find them in 21 cases, of which 4 died and 17 recovered.

The author believes that his results and those of others certainly show that the organisms obtained from the more severe and fatal cases are either more numerous or more resistant to unfavorable conditions, for otherwise positive results would not have been obtained in such cases alone.

Leucocytosis in Pneumococcus Infection of Rabbits and Men. C. S. Williamson. (Reprint from *Ziegler's Beitrage.*)

1. The leucocytic curve after inoculation with pneumococcus shows a tolerably steep ascent followed by a drop to a point considerably below the highest point. Under precisely similar circumstances an ascent was sometimes entirely absent.

2. There was an absence of any recognizable influence of the leucocytosis on the progress of the disease.

3. Subcutaneous injections of a small quantity of pneumococci cause the bacteria to appear in the blood in a few hours. Then they disappear from the blood rather rapidly. They are not retained in any internal organ.

4. Within a short time after the appearance of pneumococci in the blood the leucocytic curve falls rapidly.

The article has a bibliography with 25 references and the tables of experiments are quite elaborate.

Leucocytic Formula of Scarlet Fever. M. E. Sacquepee. (*Archives de Médecine Experimentale,* January, 1902.)

The author divides his cases into two groups, (1) Scarlatina of the regular type and (2) Scarlatina with complications.

Group 1. In the first period, that is to say, in the first week, there is hyperleucocytosis; a very marked increase in the number of polymorphonuclear leucocytes, a moderate number of mononuclear leucocytes; the eosinophiles are at first normal and then they increase quite markedly.

2d. week. Hyperleucocytosis is moderate. The mononuclears are increased. Eosinophiles slightly increased, and a mild increase in the polymorphonuclear leucocytes.

3d week. All of the elements tend toward the normal, the eosinophiles going below the normal. Finally the increase in the mononuclears reappears and after some months is strikingly constant. At this time the eosinophiles have returned to the normal figure.

Group 2. Irregular course.

Suppurative inflammation of glands causes or maintains the polymorphonuclear leucocytic increase. Mumps exaggerate on the contrary the mononuclear leucocytes.

The Leucocytosis of Scarlet Fever and its Complications. J. M. Bowie. (*Journal Path. and Bacteriology,* March, 1902.)

The author concludes that practically all cases of scarlatina show leucocytosis. It begins in the incubation period, very shortly after the infection; reaches its maximum at

or shortly after the height of the disease and then gradually sinks to normal.

In simple uncomplicated cases the maximum is reached during the first week, and the normal generally some time during the first three weeks. The more severe the case, the higher the leucocytosis, and the longer it lasts; the lighter the case, the lighter the leucocytosis, and the shorter time it lasts. A favorable case in any one variety of the disease has a higher leucocytosis than an unfavorable one of the same variety.

The fever, *i. e.*, the temperature, has no direct effect on the leucocytosis.

The polymorphonuclear leucocytes are increased relatively and absolutely at first and then fall to the normal; the lymphocytes act inversely to this; this cycle of events occurring in simple cases within three weeks.

Eosinophiles are diminished at the onset of the fever; they increase rapidly in simple favorable cases till the height of the disease is past, then diminish and finally reach the normal some time after the sum total leucocytosis has disappeared, in short, when all the poison has been eliminated.

The more severe the case, the longer are the eosinophiles subnormal before they rise again, as described above; in fatal cases they never rise, but sink rapidly toward zero and remain there. The leucocytosis, in complications, goes through a cycle of events similar in all respects to that of the primary fever, as regards both sum total and differential leucocytosis, and the same laws govern the behavior of the leucocytes in both cases.

Leucocytic Formula of Mumps. M. E. Sacquepee. (*Archives de Médecine Experimentale,* January, 1902.)

Mumps without orchitis is accompanied by a hyperleucocytosis that is remarkable so far as details are concerned but only moderate as to figures. The augmentation is principally in the mononuclear forms, large and small. The increase in polymorphonuclear leucocytes is not considerable. On the appearance of an orchitis the

mononuclears remain the same, but there is a considerable increase in the polymorphonuclear forms.

Persistence of a Lack of Leucocytic Equilibrium after Infectious Diseases. M. E. Sacquepee. (*Archives de Médecine Experimentale,* January, 1902.)

The author examined six people six months after they had been successfully vaccinated and found a material decrease in the number of polymorphonuclear and an increase in the mononuclear forms. He examined the blood of one man who had small-pox fifteen years before and found a decrease in the polymorphonuclear and an increase in the mononuclear forms.

In thirteen cases of scarlet fever examined from four to twelve months after the disease, the results were a decrease in the polymorphonuclear and an increase in the mononuclear forms.

In one case of scarlet fever in which there was a complicating nephritis, six months after the cure, there was an increase in the polymorphonuclear and a decrease in the mononuclear forms.

The author concludes that a disturbance of leucocytic percentages persists for a considerable while after the subsidence of the disease. In a general fashion the loss of the equilibrium is represented by a decrease in the polymorphonuclear and an increase in the mononuclear forms. This he has found to persist for years.

Ehrlich's Diazo Reaction. Loeper and Oppenheim. (*Gazette des Hopitaux,* May 25, 1901.)

The authors consider the value of this test in diagnosis, and in prognosis. In early tuberculosis the reaction intermits. When it is given, it means that the disease is spreading to new areas. This intermitting reaction does not indicate a bad prognosis. The prognosis is bad when the reaction is regularly present and sharp in character. This is true even though the physical signs are good. They conclude that it is of great prognostic value in tuberculosis.

As a diagnostic sign of tuberculosis they think it has a

place. In latent tuberculosis the reaction is rare. In active tuberculosis it is usual. In serous tuberculosis it is generally present, and is a good diagnostic sign.

In erysipelas, if the reaction suddenly disappears, the other symptoms not abating, the prognosis is bad.

In typhoid the reaction is of diagnostic and prognostic value.

Diagnosis. If we fail to get a reaction from the third to the fourteenth day, it means that typhoid is absent. A reaction means a probable though not certain typhoid. Its negative value is greater than its positive. It is an earlier sign than Widal.

Prognosis. The disappearance of the reaction means that the fever is approaching a termination. The persistence of the reaction beyond the fifteenth day means a prolonged attack.

Typhoid Bacilli in the Blood. A. W. Hewlett. (*New York Medical Record,* Nov. 30, 1901.)

The author made systematic examinations for bacilli in 24 typhoid patients and found them at some time or other in 83 per cent of the cases. The method employed was that of Cole; about 5 c.c. of blood was taken from the vein at the elbow and diluted in three flasks of sterile bouillon. Any bacteria growing were separated and studied further. His experiments showed that the bacilli were more frequently found in the earlier stages, the earliest being from the 4th to the 5th day. They tended to disappear during convalescence and to reappear if there was a relapse.

The author refers to four contributions in the literature, including that of Cole in the *Johns Hopkins Hospital Bulletin,* No. 124, 1901.

Presence of Typhoid Bacilli in the Blood During Typhoid. Courmont. (*Jour. de Physiologie et de Pathologie Generale,* 1902, Vol. 4.)

The author was able to find typhoid bacilli in the blood of each of nine typhoid fever patients examined. He believes that the bacilli are to be found early in the disease. The method that he has employed is about the same

as that of Cole elsewhere noted. The blood is diluted with bouillon 1 to 100 or less.

The Practical Value of Blood Examination in Medicine and Surgery. Thos. R. Brown. (*American Medicine,* Oct. 19, 1901.)

A favorable prognosis in typhoid is indicated by the early reappearance of the eosinophiles, the moderate diminution of the polymorphonuclear neutrophiles and the extreme increase of the lymphocytes.

Justus' Test for Syphilis. A marked fall in the hemoglobin within 24 hours after the administration of mercury by inunction. Cabot and Mertens substantiated this and showed the decrease to equal from 10 to 25 per cent in all specific cases tested; while of 36 cases non-syphilitic a drop occurred in only one—a case of chlorosis.

Diphtheria. High percentage of myelocytes is unfavorable. Besredka believes that if 1 or 2 days after the injection of the antitoxin the percentage of polymorphonuclear neutrophiles is 60 per cent or above, the prognosis is good. With a high temperature and 50 per cent neutrophiles the prognosis is bad, while if below 50 per cent, prognosis is fatal.

Scarlet Fever. An increase of eosinophiles is favorable.

Surgery. The author believes one should not operate if the hemoglobin is less than 30 to 50 per cent. Or if the time required for coagulation is increased to 10 to 15 minutes.

In appendicitis, if leucocytes go above 18,000 to 20,000 operate immediately.

Spermine Crystals in Pus. Ed. T. Williams. (*Boston Med. and Surg. Journal,* Sept. 26, 1901.)

The author succeeded in finding spermine crystals in abundance in pus taken from a cervical abscess. He also found other crystals that he took to be xanthin.

Atypical Acid- and Alcohol-Proof Fungus from the Sputum of a Case Clinically Resembling Tuberculosis. Ohlmacher. (*Trans. Chicago Path. Society,* Vol. V., No. 3.)

The author reports a case of adenitis beginning in the neck. Several glands suppurated. The patient began to cough. The sputum contained large numbers of a bacillus which superficially resembled B. tuberculosis. On close inspection compound branching forms were found. These resisted alcohol and the other methods of differentiating smegma bacillus suggested by Goethe, Bunge and Tranderoth, Czaplewski and Howsell. Guinea pigs inoculated with the sputum remained healthy. The patient recovered.

The Extent of Gastric Digestion in Cases of Carcinoma of the Stomach. C. P. Emerson. (*Johns Hopkins Bulletin*, April, 1902.)

The author, as the result of examinations of the stomach contents in carcinoma of the stomach and in other stomach diseases, supplemented by digestive experiments using carcinoma tissue, arrives at the conclusion that carcinoma tissue furnishes a ferment which aids in peptic digestion. His method is as follows: He gives an Ewald meal or 15 grammes of nutrose in 400 c.c. of water. This is removed in one hour. The nitrogen of the neutralized and filtered contents is determined. The protoalbumoses are precipitated with half saturation with zinc sulphate. The deuteroalbumoses are precipitated by complete saturation. Then the peptones and associated bodies are precipitated by phosphotungstic acid. The nitrogen is determined after each precipitation. That not precipitated by zinc sulphate or phosphotungstic acid is called "nitrogen remaining."

In all conditions except carcinoma the nitrogen was distributed as follows:

Primary and secondary albumoses 51.5, phosphotungstic precipitate 31.4, remaining 17. In carcinoma the figures were: 25.22, 47.04, and 27.74. More of the nitrogen had passed on to digested forms in carcinoma than in the other stomach conditions.

His next experiments showed that the same capacity resided in carcinoma tissue outside the body.

The author advises the use of nutrose, salted, as a test

meal. It is easily removed. It digests slowly and shows variations in proteid metabolism nicely.

The Occurrence of a Fat-Splitting Ferment in the Urine. Opie. (*Johns Hopkins Hospital Bulletin,* May, 1902.)

The author reports a case of fat necrosis in which he found steapsin in the urine. He thinks that this may be of diagnostic value. The method that he followed was as follows: The urine was neutralized with potassium hydroxid and divided into two parts. To one was added a few drops of ethyl butyrate, and a small quantity of litmus solution. The other was boiled and ethyl butyrate and litmus added. Both specimens were kept in an incubator at 37° C. for twenty-four hours. The unboiled specimen acquired a well-marked acid reaction.

On Urea in Some of its Physiologic and Pathologic Relations. C. A. Herter. (*Johns Hopkins Hospital Reports,* Vol. 9, 1900.)

After many experiments, the author has demonstrated that the functional effectiveness of the mammalian kidney is twelve times that of the Wolffian body of the frog, weight for weight. We are probably well within bounds in supposing that the human kidney is capable of doing twice the quantity of work in the elimination of urea that is ordinarily imposed upon it, and that it is capable of continuing this excessive activity during long periods.

It is clear that while certain changes in the appearance of the epithelial cells result from excessive functional activity of the kidney, there is no evidence that the effects produced by urea upon the epithelium are different from those produced by sodium chlorid. If the organ is damaged, the difference between the capacity of that organ to excrete urea and its ability to excrete salt is so great as to make it clear that the processes involved in the two kinds of work must be different in important respects.

The experiments of Schwarz indicate that it is possible to induce a marked degree of diuresis by means of intravenous infusion of sodium bicarbonate, or of urea, without

altering either the general blood pressure or the rapidity of the blood flow from the renal vein.

In dogs convulsive movements are only rarely absent when the percentage of urea in the blood reaches about 0.3 per cent, *i. e.*, about eight or ten times the normal content of the blood. Most animals die when the per cent reaches 0.4 per cent to 0.5 per cent.

In the damaged kidney (nephritis, or cantharidin poisoning) the injection of urea causes a suppression, while sodium chlorid leads to a free flow of urine. In double nephrectomy the urea was greatly increased in the blood, muscles, liver and brain. A considerable increase in the urea of the blood is invariably the consequence of damage to the renal epithelium or mechanical obstruction. In nephritis the urea may accumulate until the increased amount stimulates the damaged epithelium to action.

A patient is in grave danger of developing unequivocal symptoms of uremia whenever the urea content of the blood increases beyond .2 per cent and a fatal issue will almost certainly occur within a few weeks in patients in whom the urea content of the blood amounts to more than .3 per cent. Uremia sometimes occurs rapidly as a result of an acute nephritis superimposed on a chronic process. In these cases the urea percentage is high and the prognosis is unfavorable.

In other cases, the urea in the blood is not increased, and the excretion may not be perceptibly diminished. The uremic symptoms in these cases are due to other toxic substances, presumably bacterial toxins.

Urinalysis in Children. F. M. Crandall. (*Internal Medicine,* May, 1902.)

The author believes that urinalysis, as an aid to diagnosis, is largely neglected in practice among children, and that it is almost as valuable as urinalysis in the adult. He gives the following as the average specific gravity from birth to the 15th year.

After the third day, very low—1,003 to 1,007.

First six months, 1,010.

Before fourth year, 1,014.

After tenth year it may be as high as 1,020, usually 1,015, until the fifteenth year.

The urine is usually pale and colorless, reaction commonly faintly acid, amount comparatively large for the weight of the child.

Albumin, casts and sugar, may be found during the first few weeks, but this is not abnormal, while blood in the urine is probably always pathologic. Pus may come from any portion of the urinary tract, but most commonly from the pelvis of the kidney.

The Microscopical Examination of Urine in Nephritis. W. H. Bergtold. (*Colorado Medical Journal,* Sept., 1901.)

The author is of the opinion that you cannot diagnose the origin of epithelium by its size or shape, as every form of urinary epithelium may come from the bladder alone.

The discovery of casts in the urine is of prime importance, but these bodies are not necessarily indicative of nephritis; they are not rarely found in some conditions of renal irritation. It is not uncommon to find a considerable number of hyaline and at times some granular casts, with a faint albuminuria in general arterio-sclerosis and in some conditions seemingly of an irritative origin, *i. e.,* oxaluria. Hyaline casts are also found in the urine under conditions as yet imperfectly understood.

[One of the most impressive articles along this line was that of Osler in the *New York Medical Journal,* 1901, entitled "The Advantage of a Little Albumin and a Few Casts in the Urine."]

Relation of Indicanuria and Oxaluria to Gastrointestinal Fermentation. J. A. Wesener. (*Chicago Medical Recorder,* July, 1901.)

Traces of oxalates are found normally in the urine, having been taken in with the food.

Oxalate crystals usually denote gastrointestinal fermentation. Foods rich in oxalates must be excluded. Abundance of oxalate crystals does not signify high oxalate per-

centage. Indican is often, but not necessarily, associated with oxalate crystals.

Hyperacidity on a meat diet contributes to putrefaction, whether due to excess of hydrochloric acid or acids of fermentation. In certain disturbances of the gastrointestinal tract due to excess of hydrochloric acid or to excess of fatty acids, in which there is fermentation, indican and oxalic acid are increased.

The article has a bibliography with 64 references.

On the Evolution of Myelopathic Albumosuria. T. R. Bradshaw. (*British Med. Journal,* July 13, 1901.)

The author concludes that the presence of the albumose in the urine is the earliest symptom of the disease, and may be observed for many months in advance of any other symptom.

A New Test for Albumin. Flora C. Fuhs. (*Medical Record,* March 8, 1902.)

The solution consists of equal parts carbolic acid and glycerin. The test is made by taking 2 c.c. of the carbol-glycerin solution in a small test tube, to which an equal amount of filtered urine is added.

Mix thoroughly with a glass rod or agitate. If a clear transparent liquid results, there is no albumin present; but if the slightest turbidity is noticeable, the urine is albuminous.

The test is very sensitive, distinctly showing the presence of 0.1 per cent of albumin in urine and it does not show turbidity unless albumin is present.

Proteosuria. H. O. Mosenthal and Wm. J. Gies. (*Am. Medicine,* March 8, 1902.)

The authors give Freund's method for the detection of the proteoses and other proteids in urine and feces.

"Take 10 c.c. of urine, first acidulated with 2 or 3 drops 2 per cent acetic acid, and then treated with 20 per cent neutral or basic lead acetate—5 c.c.—thoroughly boil and filter off the precipitate of proteid, inorganic matter, etc. The filtrate is next treated with KOH as long as a precipitate of lead hydroxid continues to form, when the mix-

ture is again boiled for a moment or two. The presence of the proteose is finally detected by the biuret reaction.

The test gives the reaction with many other substances and therefore cannot be applied as a differential test.

Bence Jones Albumin. Chas. E. Simon. (*Am. Jour. Med. Sciences,* June, 1902.)

This albumin occurs in cases of multiple myeloma or osteomalacia. The peculiarities as given by Matthews are as follows:

1. If much salt is present, the coagulated substance is not entirely soluble on boiling, while a precipitated albumose is soluble at 100 C., no matter how much salt be present.

2. An aqueous solution of the substance does not pass through animal membrane, even in traces; while both proto-albumose and deutero-albumose are dialyzable to some extent.

3. The substance in question after coagulation is still soluble on washing with distilled water, as also on dialysis, especially if this is continued until practically all salt has been removed. Hetero-albumose, on the other hand, is entirely insoluble in distilled water and is precipitated on dialysis.

4. The substance differs from hetero-albumose in the fact that it is apparently coagulated by heat, in any concentration, in the presence of a small amount of salt and acid, while hetero-albumose coagulates only in very concentrated solutions.

5. On peptic digestion the Bence Jones substance yields a proto-albumose, showing that its molecule must be more complex than that of the primary albumoses.

The Scientific Basis of Clinical Cryoscopy. Koranji. (*Berliner klin. Woch.,* Dec. 2, 1901.)

The writer concludes that the determination of the freezing point of urine and blood is a valuable clinical procedure.

Nature of the Fats and Allied Bodies in Chylous Urine.

A. E. Austin, M. D. (*Journal Medical Research,* June, 1901.)

The writer believes the source of fat in the urine to be the chyle.

He found that most of the fats existed in the form of neutral fats and glycerids.

In the two urines analyzed, free fatty acids were present only in a small trace. Oleic acid was in the largest amount, 83 per cent to 85 per cent, with a smaller amount of palmitic and stearic acids.

The Occurrence of Milk Sugar in the Urine of Nursing Women, with a Note on the Best Means for its Differentiation from Grape Sugar. Carstairs Douglas. (*Scottish Med. and Surg. Journal,* March, 1902.)

In the urine of 56 nursing women examined Douglas found milk sugar in 85 per cent of the cases. He arrives at the diagnosis of milk sugar by exclusion. The urine fermented. It did not react with pheno-hydrazine. It responded fairly well to Fehling's test. These are the conclusions on which he makes his diagnosis of milk sugar as distinguished from glucose.

It does not appear that the author took advantage of the polariscope in his series of observations.

The Nitro-Propial Test for Sugar in Urine, Based on 200 Observations. Carstairs Douglas. (*Glasgow Med. Journal,* Jan., 1902.)

The author states that the reaction is obtained by heating ortho-nitro-phenyl-propiolic acid with grape sugar and an alkali.

The advantages claimed for it are: that it is striking and distinctive; little urine is required; the test is very delicate; the reagent is put up in a compact, dry and convenient form, and it is comparatively inexpensive.

The Occurrence of Green or Blue Urine and its Most Frequent Cause. F. P. Weber. (*London Lancet,* Sept. 21, 1901.)

The author believes that green or blue urine is in

most cases due to the ingestion of methylen blue, either as medicine or in the form of various sweets, candies, etc.

Red urine is probably due to fuchsin used as a coloring agent.

Microchemical Reactions of Tube Casts. W. M. L. Coplin. (*Philadelphia Medical Journal,* March 8, 1902.)

The author states that hyaline casts are of two varieties, those that stain faintly with the mucin stains and those that stain intensely, giving the mucin reaction to a degree that renders them almost opaque.

Epithelial casts commonly give a decided mucin reaction, the intensity of which seems to be directly proportionate to granularity of the cells.

Fatty casts are found to be composed of masses and groups of fat globules possessing slightly different characters, depending upon the quantity of the fat and the grouping, and held in position by some matrix, the exact microchemic nature of which it has not been possible to determine.

Observers seem to have agreed that fatty casts result from fatty metamorphosis of renal epithelium. It seems equally probable that other casts are also the result of necrosis or degeneration of renal epithelium, and that during the progress of the retrograde change mucin becomes a conspicuous constituent.

Hyaline and Granular Casts in Albumin Free Urine. Craandyk. (*Correspond. Blatt. f. schweizer Aertze,* May 15, 1902.)

The author reports finding casts in 20 out of 109 urines which contained no albumin—18 per cent of the cases. The casts were usually of the hyaline variety. In about one-fourth of his cases they were granular. In nearly all of the cases leucocytes were found. In about one-half of them red blood cells were found.

SECTION III.

BACTERIOLOGY.

GENERAL.

The past year has been fruitful in the elaboration of details in scientific bacteriology. No entirely new or exceptionally novel observations have been made. Investigators have been busy studying out the details of the numerous problems that the work of the past two to three years has brought forward. In a review of bacteriologic progress Bergey[1] brings out the advance as shown in study of morphology, biology, and biochemistry. The polar granules are shown by Marx and Waith[2] to be due to the character of the nutrition in the cell. It appears that these granules have something to do with preservation and they have been called germ-protoplasm as a distinction from the remaining portion. Branching forms in bacilli have received much study. This has had its greatest interest in consideration of the opinions of some who would place such organisms among the mycelial forms. In view of the fact that they are not true branchings but only outgrowths from germ protoplasm (granules of Ernst) the majority of students still class such bacilli as fission fungi and in the same place as in the earlier days of bacteriology.

Enzymes. C. Eijkman. (*Central. f. Bacteriologie,* Bd. XXIX., No. 22, 1901.)

The enzymes studied by Eijkman include four groups: Casein-splitting, hemolytic, diastatic and fat-splitting. That a casein-splitting ferment was present in a number of species studied was shown by gelatin streaks on milk agar plates. A streak of melted gelatin is made radially

(1) Medicine, Vol. VII, No. 8, p. 617, Aug., 1901.
(2) Central. f. Bacteriologie, Bd. XXVII.

from the colony under study. The enzymes are absorbed by this thin layer of gelatin much more readily than by the agar, but after it has become liquified it is absorbed into the plate without a trace remaining. In this way the enzyme is carried into the milk agar at some distance from the colony and its specific effect in disintegrating the casein may be observed.

Fat in Bacteria. Arthur Meyer. (*Central. f. Bacteriologie,* Bd. XXIX., No. 21, 1901.)

The writer has observed fat droplets in many species and has found their ready solubility in chloral hydrate solutions and resistance to the action of Eau de javelle to be important as means for differentiation. These tests in addition to reactions to stains, Sudan and Carbol-fuchsin, are valuable methods for differentiation between many species and may assist in recognizing pathogenic varieties.

The Structure of Bacteria. K. Nakanishi. (*Centralb. f. Bact.,* Bd. XXV., No. 3-6, 1901.)

This very extended discussion of bacterial structure is based on a method of staining the living cells by very weak staining fluids applied in hanging drops or other suitable manner. It was shown that living cells could be readily stained by methylene blue. The stain is not taken evenly, but certain areas inside and outside are colored. A single stained granule is present in all young cells. The cell membrane is a thin structureless covering. The capsule is not a part of the cell, but consists of excreted material. "Cytoplasm" makes up the mass of the structure and this consists of "Ektoplasm" that takes color readily and "Endoplasm" that remains clear. A granule is the center of the bacterial cell; this is round, oval or hour-glass shaped. The granule is smaller in the sporing varieties of bacteria. Cell division proceeds in exactly the same way as in higher cells. The central granule divides first. Next a partition of ektoplasm is formed and the endoplasm is divided. Longer diphtheria bacilli are made up of groups of cells, only the small wedge shaped cells are

single. Bacteria of the cholera group show a complicated indefinite structure. Spores are formed about the granule, the cytoplasm becomes clear, later bright and refractile and a new cell wall is formed about it.

Proteolysis by the Bacteria. E. Cacace. (*Centralb. f. Bact.,* Bd. XXV., No. 6, 1901.)

The conclusion is reached that the digestion of albumen by the bacteria takes place with the formation of all usual intermediate products, protoalbumose, deuteroalbumose, through to peptones. This ferment action is exactly the same as that observed in higher life. Sometimes the products of proteolysis are absent in growths of bacteria in full development.

Streptococci and their Toxins. A. Marmorek. (*Ann. de l'Instit. Pasteur,* Tome XVI., No. 3, 1902.)

For a long time we have been trying to attain two ends in our experiments with the streptococcus, one the preparation of the toxin of this infectious microbe, and the other the preparation of an antitoxin of curative value. Our researches resulted in the following: All the streptococcus species of different origin give the same toxin. These belong to a group of diastases which are destroyed at a temperature of 70° C. The serum prepared by the aid of the toxin of the same microbe is active against the toxins of streptococci of other origin. By this process we obtain a toxin that kills a rabbit in a dose of 0.25 c.c.

We can declare with authority that there are no divers races of streptococcus for man. On the contrary, the chain cocci met with in man belong to the same family. The streptococcus may live a long time associated with other pathogenic microbes.

Some Observations on the Biology of the Bacillus of the Pest. E. T. Wilson. (*Jour. Med. Research,* July, 1901.)

According to the author the most important points to be considered in a suspected case are: The stalactite test in bouillon; the behavior on salt agar, and the results of vaccination of rats, or guinea pigs, with the suspected material.

Some Observations on the Bacillus Anthracoides. F. A. Bainbridge. (*Journal Pathol. and Bacteriol.,* March, 1902.)

Resembles bacillus anthracis very closely. The bacillus is straight, short and thick; average 1.3 microns in breadth, by 5.5 microns in length. It forms short chains, but isolated bacilli can be found. The organism is motile, but not actively so. Stains by common method and also by Gram's. Each bacillus has a separate capsule. Spores in the center of the bacillus form readily, these stain by the ordinary method, but with difficulty. Spores are very hard to kill.

Mice inoculated invariably died in less than 48 hours. Post-mortem showed enlarged spleen; other organs normal. Some serous fluid; no blood or pus obtained at site of inoculation. No guinea pig was killed though inoculated more than once. Virulence increased by passage through animals.

Characteristics of Ray Fungi. L. Hektoen. (*Trans. Chicago Path. Soc.,* Vol. IV., 1901.)

The literature is reviewed and a comparative study of ray fungi and certain bacteria is presented in this article. The great difficulty in finding a precise location for this group among the fungi is apparent. Another point is what relation do *B. tuberculosis* and *B. diphtheriæ* bear to ray fungi, and shall they be included in this group? The views pro and con are fully discussed.

ETIOLOGY AND EXPERIMENTAL.

The Evolutionary Aspect of Infectious Diseases. G. F. Lydston. (*Jour. Am. Med. Assoc.,* May 17-24, 1902.)

The author takes examples from laboratory observations as to the variability of different pathogenic bacteria and applies them to clinical conditions. The view is taken that changes in virulence and possibly biologic and reactionary alterations are evidence of evolution. On this account the

doubtful destruction of species is made possible, and the change of a now recognized nonpathogenic bacterium into a pathogenic species may occur. The opinion is further expressed that gonorrhea and chancroid develop *de novo* in the medium afforded by the secretions of the unclean and pathologically contaminated vagina. This development depends upon adaptation changes in the comparatively non-virulent type—a spontaneous culture modification.

Bacteria in the Normal Lung. J. Boni. (*Deutsche Arch. f. klin. Med.*, Bd. LXIX., Heft 5-6, 1901.)

In view of the difficulty of examining the lungs of healthy persons, the lungs of laboratory animals and those in slaughter houses were examined. In the majority of instances the lungs of guinea pigs in the laboratory were found free from bacteria, but occasionally even pathogenic pneumococci were found. Cultures that were made from the lungs of animals in the slaughter house showed 30 per cent sterile, while the remainder showed mostly bacteria of low virulence. Among the pathogenic species isolated and studied the M. pneumoniæ, streptococcus pyogenes, staphylococcus pyogenes aureus, and bacillus pneumoniæ were found; of these, pneumococci occurred in 25 per cent of the cultures.

Do Bacteria Pass Through the Placenta to the Fetus? N. K. Nulow. (*Centralb. f. Bact.*, Bd. XXXI., Orig. No. 14.)

In place of using pathogenic bacteria as usual for such experiments, a series of culture tests of blood and organs on both sides of the placenta is reported after an injection of large numbers of spores of bacillus subtilis in the maternal circulation. Most of the injected spores were found in the spleen and liver of the mother and very few in the placenta. The fetus was free from subtilis and the conclusion is made that at least nonpathogenic bacteria do not pass the placenta.

An opinion is advanced by the author that the placenta has one function, namely, nourishing the fetus, and does

not partake of the property existing in the liver and spleen of animals by which bacteria are intercepted and withheld from the blood stream.

Typhoid Bacilli in Urine. H. E. Davies. (*Trans. Chicago Path. Soc.,* Vol. IV., 1901.)

Out of 418 specimens of urine from 65 cases of typhoid fever, 105 samples from 21 cases showed presence of this bacillus. In most instances the bacilli were found in the third and fourth week of the disease. The bacilli may continue in the urine for several weeks after the temperature becomes normal. The larger number appear just after the height of the disease.

Grass Bacillus II. (Moeller) in Cold-Blooded Animals. Flymouth. (*Centralb. f. Bacteriologie,* Bd. XXIX., No. 12, 1901.)

The author injected this acid-resisting bacillus into frogs and found that it was pathogenic for them. In ten days abundant pathologic changes resulted, while comparative injections with B. tuberculosis showed in the animals only slight lesions after several months. Intraperitoneal injection resulted in adhesions between the intestines and numerous tubercular masses from which the contents, rich in leucocytes, could be expressed and from which the bacteria could be stained and cultivated. An interesting observation is reported by the author. A grass bacillus differing markedly from the B. tuberculosis on agar, after being retained eight days in the peritoneal cavity of a frog, showed a much closer resemblance to the tubercle bacillus, evidence of branching even being present. On the other hand, a tubercle bacillus retained similarly in the frog's peritoneal cavity assumed the short, even shape of the grass bacillus.

Acid-Resisting Bacteria on Mucous Membrane of Nose. Karlinski. (*Centralb. f. Bacteriologie,* Bd. XXIX., No. 12, 1901.)

He reports a critical examination of specimens from the noses of 235 persons in health and disease for acid-resist-

ing bacteria. Among these 235, such bacteria were found in 19 instances:

Secondary syphilis.....	2 times.
Tertiary syphilis.....	3 "
Intermittent fever.....	4 "
Ordinary cold.....	2 "
Healthy persons.....10	"

Four of these persons showed slight superficial lesions of the mucous membrane. The report of the experiments is quite full and shows that the bacteria were obtained in cultures and tested upon animals for the differentiation. As these observations were made in the far east the author reviews the differentiation from the bacillus of leprosy and remarks that the bacteria studied were more alcohol resistant, larger, and did not show the barrel-stave grouping that is more characteristic of the latter organism.

Acid-Resisting Bacilli. Walker. (*Centralb. f. Bacteriologie,* Bd. XXIV., No. 10, 1901.)

A comparative study of three species of acid-resisting bacilli, butter bacillus—Petri-Rabinowitsch, timothy-hay bacillus and grass bacillus was made, from which was determined the following: In cultures these pseudo-bacilli are differentiated from the tubercle bacillus by their growth at low temperature and by pigment formation. They also grow rapidly. In animal experiments they were found to be easily cultivated from the tissues which is a matter of difficulty with the tubercle bacillus.

These bacteria were pathogenic for animals, but did not cause tubercular lesions. Although the resemblance to tubercle bacilli is strong the organisms are more closely allied to the pus bacteria. In making a differential diagnosis the author calls attention to the fact that in fresh material the staining alone is not a distinctive difference. Pure cultivation is necessary and even animal experiments, if passed upon early, may be a cause for a wrong opinion. It was observed that in older specimens from tissues the

pseudo-bacilli lost to a large extent their acid-resisting power, while in the tubercle bacillus this is retained to the fullest extent.

A Study of the Variation in Virulence of B. Tuberculosis in Man. A. J. Lartigau. (*Jour. Med. Research.*)

Conclusions:

The inoculation of tubercle bacilli of different human derivations in fixed amounts into animals induces various degrees of tissue reaction, *i. e.*, tuberculosis.

The inoculation of varying amounts of the same culture is followed by marked difference in the distribution of the tuberculosis.

The differences in the number and distribution of the lesions found, with the acuteness of the process and extent of tissue reaction, may be taken as indicating the variations in virulence when the infections have been induced under similar conditions in the series of animals compared.

Subcutaneous inoculation of even 20 milligrams of a pure culture of bacilli of feeble virulence often induces no lesion or scarcely more than a localized tuberculosis at the seat of inoculation. Very virulent cultures inoculated subcutaneously in amounts of less than a milligram may induce general tuberculosis in a very short time in rabbits as compared with those of lesser virulence.

No relation can be observed between the morphology and virulence of the bacilli investigated.

Bacilli of widely different virulence may be present in any of the various human tuberculous lesions.

In scrofulous lymphodermitis the bacilli are generally of low virulence; sometimes bacilli of great virulence may be present.

The bacilli present in pulmonary tuberculosis—with ulceration—may be of feeble virulence, especially in those cases in which clinical history indicates a slowly progressing lesion.

When bacilli of great virulence are present in lymphodermitis, the infection is apt to spread to other tissues.

Bacilli of great virulence occur in acute miliary tuberculosis.

Healed tuberculosis of the lung may contain virulent or attenuated bacilli.

There may occur a fresh infection with extremely virulent bacilli in an individual already affected with a lesion containing bacilli of slight virulence.

Bacilli of low and high virulence may be contained in chronic tubercular bone lesions.

Tetanus and Vaccination. R. H. Wilson. (*Jour. Am. Med. Assoc.*, May 3-10, 1902.)

An extended review of 52 cases in which tetanus occurred or was said to have occurred, collected from the literature from 1839 to date is presented. The general conclusion is reached that tetanus infection after vaccination is rare, that evidence of the bacteria having been on the skin is frequently as strong as that it was in the vaccine. Experiments in the examination for tetanus bacilli were negative.

Fourth of July Tetanus. H. G. Wells. (*Trans. Chicago Path. Soc.*, Vol. IV., 1901.)

A series of cultures from cartridges, such as are used in celebrations, is reported. Under anaerobic conditions the various parts, outside, wads, powder, etc., were cultivated for B. tetani with uniformly negative results. Numerous other pathogenic and nonpathogenic bacteria were found. It is concluded that the cartridges are not in themselves to be blamed for the frequency of tetanus after such injuries.

Etiology of Acute Dysentery in the United States. Vedder and Duval. (*Jour. Exp. Medicine*, Feb. 5, 1902.)

The several standard cultures used by the authors are indistinguishable, a conclusion already reached by Flexner. The acute dysentery of the United States is due to a bacillus indistinguishable from that obtained from the epidemics of dysentery in several parts of the world. Epidemics and sporadic cases are caused by the same bacillus. This organism is the *Shiga-Bacillus dysentericæ.*

Streptococcus Mucosus (Howard) and Its Relation to Micrococcus Lanceolatus. Longcope. (*University of Pennsylvania Medical Bulletin,* April, 1902.)

The bacteria isolated from three cases of infection in which varieties of micrococcus lanceolatus appeared were studied comparatively with the above named species. From one of these cases a species resembling Howard's organism was isolated; from another, the typical micrococcus lanceolatus, and from the last a variety giving typical characters of M. lanceolatus in the first cultures showed, upon repeated transplantation, considerable variation so that it was then classed as a capsulated streptococcus. The author places this organism as an intermediate species between S. mucosus and M. lanceolatus and remarks that if this is true the S. mucosus of Howard would be brought under the group of M. lanceolatus. He concludes finally that the pneumonia organism admits of a somewhat wide variation that cannot be looked upon as distinct species, but caused only by peculiar conditions of growth.

Leucocytes and Streptococci. F. B. Simon. (*Centralb. f. Bact.,* Bd. XXIV., No. 3, 1901.)

Fluids rich in leucocytes, mostly of the polymorphonuclear variety were obtained and a separation of the formed elements from the fluid part obtained by centrifugation. The leucocytes so prepared were placed in normal salt solution. The effect of the cells, the fluid portion, the entire exudate and blood serum on several cultures of streptococci was investigated as a comparative study. The results show that streptococci of low virulence are destroyed in large measure in a 24-hour contact with the leucocytes alone, but not by the fluid part of the exudate nor by the entire exudate. Streptococci of high virulence retain their activity and multiply when in contact with the cells. It is considered that virulence is largely a matter of immunizing the bacteria against the constituent bodies in tissue cells.

Etiology of Yellow Fever. Walter Reed. (*Jour. of Hygiene,* Vol. II., No. 2, 1902.)

The findings of the United States Army commission for investigation of yellow fever together with supplemental

confirmatory notes are reported. Very extensive bacteriologic examination of the blood of yellow fever cases and cadavers was made with special reference to the demonstration and isolation of bacillus icteroides of Sanarelli. This part of the work gave such negative results that it was soon abandoned. However, it was established that the blood of yellow fever cases did not contain any micro-organism, either bacterial or protozoan, that could be seen with a 1-12 objective.

Inoculations on 12 soldiers and non-immunes were next made with a view of proving if the disease could be transferred by the blood. Fresh blood, partially defibrinated blood, blood heated for 10 minutes at 55° C., and filtered blood serum were used. Among these 12 persons, 7 cases of yellow fever developed. The heated blood failed to infect. These results proved that the blood contained the specific agent at least during the first, second, and third day of the attack. This blood did not contain any bacteria that would grow on laboratory media. The observation previously made that non-immunes could care for yellow fever cases without danger was verified in the study of a local epidemic coming under control of the commission.

The importance of fomites as an agent in transmission was completely overthrown. In considering the spread of yellow fever in certain localities and the annual sick curve for the city of Havana, it became apparent that some special influence was at work or a special intermediary host acted in transmission. The propagation relative to the bites of mosquitoes was studied with result of attaching a clue to a certain species—Stegomyia fasciata. Twelve immunes were inoculated by the bites of mosquitoes that had been fed on the blood of cases of yellow fever in Havana. Ten, or 83⅓ per cent, became infected within the proper period of incubation. The absence of mosquitoes was also shown to be the chief point in avoiding the disease even when susceptible individuals were exposed directly to the yellow fever sick and their belongings. The question of measures for the prevention of yellow fever is

discussed. All these should be directed towards the mosquito in its destruction and in protecting the sick from the bites of free insects. Charts showing the results of these measures in Havana are appended.

Experimental Bacillary Cirrhosis of the Liver. L. Hektoen. (*Jour. Path. and Bact.*, p. 214, 1901.)

The Bacillus. Morphology. Is four or five times as long as thick. Stained with Loeffler's methyl blue; these have stained zones, alternating with unstained. Organisms have tendency to arrange themselves in parallel groups. Stain by Gram's. Do not show granules by Neisser method. Is non-motile.

Glycerinagar plates. Pin-head size circular yellowish points, solidly granular and irregular margins. Gelatin plates, brownish circular and sharply outlined colonies.

Agar agar, a spreading moist slightly raised growth.

Glucose agar, a moderate growth, with no gas formation.

Gelatin, no liquefaction, whitish growth.

Alkaline bouillon, diffusely clouded, a film forms at the top and settles to the bottom, as a heavy grayish-white sediment.

Litmus milk, no coagulation on fourth day. Turns red in some tubes. No acid found. No gas formed.

A slight amount of indol is produced. 59° C., 3 minutes, kills. Anaerobic.

Animal experiments. Subcutaneous injection of 1.5 c.c. of bouillon culture generally produces in from two to four days a marked hard infiltration, followed by the development of more or less extensive punched-out ulcers, which heal. The animal becomes thin and dies in from three to five weeks. The essential change is cirrhosis and necrosis of the liver. The bacillus can be recovered from the internal organs.

Histologic Changes in Animals Inoculated with Diplococcus Scarlatinae (Class). E. R. LeCount. (*Trans. Chicago Path. Soc.*, Vol. IV., 1901.)

Several animals inoculated with the diplococcus scarlatinæ of Class were examined by the author for the histologic changes that had taken place in various organs owing to the infection. Areas of focal necroses were found in the livers but not of large size. In the spleens of some animals, especially in the Malpighian corpuscles, dividing nuclei and free chromatin granules occur. Plasma cells are abundant in some sinuses. In the kidneys, swelling of the epithelium is the only change and a few hyaline casts are found.

The investigation is not extended enough to make full comparison, but it is pointed out that the lack of lesion in the kidney does not compare with reports on the pathology of this disease.

Bacteriologic Examination of Renal Secretion in Zymotic Disease. Lewis. (*Edinburgh Medical Journal,* Dec., 1901.)

From the literature the author accepts the occurrence of bacteriuria in zymotic cases. The results of experiments presented deal with typhoid fever, scarlet fever and diphtheria. One hundred and fifty-eight specimens from 45 cases were examined with the result of finding B. typhosus once and B. coli communis frequently (exact number not given). The examination of 51 specimens from 16 cases of scarlet fever showed streptococci present in seven. Two varieties of streptococcus were found; these are fully compared with the organisms described by Klein, Kurth and Baginsky, but in stating his final conclusions the author is not altogether certain that his organisms are identical with either of these. From 17 diphtheria cases 43 specimens were examined without finding the diphtheria bacillus. The opinion is offered that specific organisms do not appear with great frequency in the urine, but that they may, and especially because of their insidious occurrence all specimens should be sterilized and no case should be discharged until bacteriologic examination shows the urine free from specific bacteria.

PATHOGENIC BACTERIA.

Bacteriology of Cystitis. T. R. Brown. (*Johns Hopkins Hosp. Bulletin,* Vol. X., 1901.)

The paper deals with a report of the bacteriologic findings in 60 cases of cystitis. The following micro-organisms were isolated: B. coli communis, 3 times; staphylococcus pyogenes albus, 7 times; B. tuberculosis, 6 times; staphylococcus pyogenes aureus, 5 times; a slowly liquefying urea-decomposing, white staphylococcus, 4 times; B. proteus vulgaris, twice; B. typhosus, B. pyocyaneus, and an unidentified bacillus resembling in many ways colon bacillus, each, 1 time. In 2 cases no bacteria were present. The urine was always acid in 45 cases (B. coli communis, B. tuberculosis, B. typhosus, B. pyocyaneus, unidentified bacillus); generally acid, although occasionally neutral and on rare occasions alkaline, 12 (staphylococcus pyogenes albus and aureus); alkaline or ammoniacal, 6 (white, urea-decomposing staphylococcus and B. proteus vulgaris). Pure cultures were obtained in 59 out of 60 cases studied.

These results show that the B. coli communis is by far the most common organism found in all cases of cystitis, and that in the majority of cases the urine is acid. A bacteriologic study of pyelonephritis gives practically the same results; in addition albumen is present. The mode of infection in cystitis is usually through the urethra—unless secondary to a pyelitis. There may also be some focus of infection in the adjacent structures or the infection may take place through the blood and lymph. In pyelitis, ascending infection from the bladder and that carried by the blood and lymph stream are about of equal frequency.

Any condition that reduces the resisting power of the bladder must be looked upon as an etiologic factor in cystitis.

Other observers have attained similar bacteriologic results. Many changes have been observed in all the various forms of bacteria as they appear in cystitis, which is doubt-

less a result of their changed environment. Another interesting observation is that of the agglutination of the bacteria by the serum of the patient. This has been tried with the B. coli communis, B. proteus vulgaris, and B. typhosus, with positive results.

Certain conditions exist which present most of the symptoms of cystitis, but with no infection, *e. g.*, hyperacidity of neuropathic origin. The diagnosis of renal infection can be made with absolute certainty only by catheterizing the ureters, but much can be learned from a careful study of the urine alone.

Tuberculous infection of the urinary tract frequently occurs with no other demonstrable tubercular lesions elsewhere in the body. A careful chemical and bacteriologic study of the urine is necessary in order to make a diagnosis.

Bacteriology of Lobular Pneumonia. Geo. Blumer. (*Albany Med. Annals*, Aug., 1901.)

A bacteriologic study of 71 cases was made by the writer, and his associates. Of these, 53 were in adults. Thirty-three were single infections, as follows: streptococcus, 9; colon, 8; staphylococcus aureus, 7; proteus vulgaris, 3; pyocyaneus and paracolon, each 2, and staphylococcus albus and pneumococcus, each one. In 20 cases of mixed infection the bacterial incidence showed: Colon and S. aureus, 4; colon and streptococcus, 3; S. aureus and streptococcus, 3; colon and pneumococcus, 2; colon and S. citreus, 2; typhoid and streptococcus, 2; colon and pyocyaneus, pneumococcus and pyocyaneus, colon and S. albus, lactis aerogenes and streptococcus, each one. Of 18 cases in children, 12 were single infections; 5 streptococcus, 2 S. aureus, 2 colon, 1 pyocyaneus, 1 unidentified bacillus, and one case sterile. Six were mixed infections; 3 due to S. aureus and streptococcus; 2 to colon and streptococcus, and 1 to aureus, albus and streptococcus. It is considered that the absence of pneumococcus in so many cases is possibly due to its failure to grow on media at incubator temperature, or to an overgrowth by other bacteria, especially by the colon bacillus.

The rarity of Friedlander's bacillus is not to be explained on the same grounds. The frequency of bacillus coli is to be explained as largely due to post mortem invasion. This is shown in this series by a comparison of the general bacteriologic findings with that in the lung. In the 53 cases in adults, the colon bacillus was present, either alone or with other organisms, in 21, and in 12 of these there was general colon invasion. In seven out of eight simple colon infections there was a general distribution of colon bacilli throughout the organs. Here a study of normal and congested lungs, as to the bacteria present, becomes a matter of interest. Of 20 lungs which were acutely congested, 6 were sterile. The others contained colon; alone, 6; with aureus, 3; with albus, 1; with Friedlander, 1. Streptococcus alone was found in 1, and aureus, typhoid, lactis aerogenes, and Friedlander each once. Four cases of edema, and 17 cases of edema and congestion, and four normal lungs were examined, and all showed the presence of bacteria. Colon bacillus and staphylococci were the most frequent bacteria present. Cultures from eight cases of broncho-pneumonia complicating typhoid showed that typhoid bacillus was present twice, both times with the streptococcus. The colon bacillus was present four times, twice alone, and once each with aureus and pneumococcus. As regards the method employed: The surface of the lung was seared with a hot iron, and an incision made through this area, with a sterile knife, into the lung tissue. Smears were made directly and various media were inoculated from the tissue fluids.

Gaseous Edema. W. Loeffer. (*Archiv. f. path. Anatomie,* Bd., 168, Heft II.)

Edema in the tissues and the formation of froth in the organs is discussed, and from a study of the subject the conclusion is reached that it is always a post mortem condition. That certain cells in organs involved in the process show what is apparently necrosis is attributed to the physico-chemical effects of staining, and not to action of the gas-producing bacilli.

Paracolon Bacilli. R. S. Strong. (*Johns Hopkins Bulletin*, May, 1902.)

A case is described in which the paracolon bacillus was isolated from the spleen after death. The clinical history of this case resembled typhoid.

Case of B. Aerogenes Capsulatus Invading Body from a Gangrenous Lung. Madison. (*American Med.*, April 5, 1902.)

The patient in question was under observation from June 15, 1901, to September 14, when she died. A chill and temperature up to 101° was noticed some days before death. The breath was always very foul; no subcutaneous edema was noticed.

The autopsy was performed 30 hours after death. No subcutaneous emphysema was found. The pericardial sac, the superficial vessels and cavities of the heart contained gas. The lower lobe of the left lung was almost consolidated. A portion was gangrenous and emitted a very foul odor and gas bubbles were numerous. In the right lung there were some small areas of consolidation, but no gangrene and few gas bubbles. The liver was filled with gas bubbles that gave a sharp snap when opened. The spleen was enlarged and crepitated distinctly. Gas bubbles found in kidneys and spleen. The brain showed many gas bubbles about and in the vessels, however, many small gas cysts were present in the brain, that were not noticed until the brain was hardened.

Anatomic diagnosis—General paralysis; broncho-pneumonia with gangrene; pleurisy with effusion; pneumopericardium; gas in heart, vessels, lungs, liver, spleen, kidneys and brain due to B. aerogenes capsulatus.

Smears from the organs and blood, cultures and sections all showed the capsule bacillus in large numbers. Several loops of material from the liver in sterile water were injected into the ear veins of rabbits; these were killed and placed in the thermostat. After six hours subcutaneous emphysema was present and the organs were found as typi-

cal "Frothy organs." Stained specimens and cultures showed the bacilli abundantly present.

Sections from the various organs showed the tissue to be much compressed and disintegrated. In the brain the cysts were numerous but small. Some were quite round, others irregular. No evidence of a lining membrane was present.

In concluding the report the author remarks that the case under consideration seems to be the first reported of cysts in the brain of a general paralytic, known to be due to gas-forming bacilli. The cysts were small and the dilation of the perivascular spaces only little more than that often seen in general paralysis and for this reason their true nature might have passed unnoticed.

Gangrene Caused by B. Aerogenes Capsulatus. L. M. Loeb. (*Trans. Chicago Path. Soc.*, Vol. IV., 1901.)

Two cases of emphysematous gangrene caused by this bacillus are described. In Case 1 the edema was located over the left arm, shoulder and forearm; in Case 2 the leg of a child was the seat of the infection. Case 1 was fatal, Case 2 recovered. In both extended bacteriologic examinations showed that the specific bacillus was present.

Bacteriology of Dysentery. Lewkowicz. (*Przeglad lekarski*, No. 5-7, 1901.)

The author believes that epidemic and tropical dysentery are caused by a micro-organism to which he has applied the name "Enterococcus." Three cases were examined; a mother and child who died of typical dysentery and a case of meningitis as a complication of dysentery. In this last case the organism was found in the fluid of spinal puncture. The bacterium studied resembles the pneumococcus and is a capsulated streptococcus. Cultures were found to be pathogenic for animals, especially white mice, and produced local inflammatory changes rather than general sepsis. Little toxic action was noted. Inoculation in the peritoneal cavity of guinea pigs gave an abundant fibrinous exudate and sometimes considerable pus.

Endocarditis Due to Gonococci. Wassermann. (*Muench. med. Wochenschr.*, 1901, No. 8.)

The writer examined the fibrinous exudate on the aortic valves of a man who had died of a gonorrheal prostatitis and cystitis with involvement of the kidney and found therein diplococci that did not stain by Gram and had the appearance of gonococci. He was able to cultivate these cocci on human blood-agar plates and on other special media. Examination of the resulting cultures gave all the typical findings for gonococci, thereby making the differentiation perfectly clear.

Pneumococci in Arthritis. J. B. Herrick. (*Jour. Am. Med. Assoc.*, April 5, 1902.)

Two cases are reported in which pneumococci were found in the joints. One of these involving the elbow showed a purulent fluid on aspiration. Attention is called to the rarity of the condition and to its being usually a complication. Fatal cases are probably to be attributed to the croupous pneumonia, empyema or meningitis rather than to the joint affection.

The Bacteriology of Erysipelas. G. E. Pfahler. (*Philadelphia Medical Journal*, April 19, 1902.)

In all, 98 cases of erysipelas were studied by microscopic preparations, cultures and animal experiments. The following is a summary of the results:

1.	Number of cases studied	98
2.	Growth of bacteria obtained upon the artificial medium	88
3.	Number in which a second inoculation was necessary to obtain growth	5
4.	Number of cases in which diplococci were found.	86
5.	Diplococci were found in pure culture in	66
6.	Mixed cultures were obtained in	20
7.	In the mixed cultures streptococci were found in.	10
8.	In the mixed cultures staphylococcus aureus in..	7
9.	In the mixed cultures staphylococcus albus in..	2
10.	In the mixed cultures bacilli in	2
11.	The staphylococcus aureus occurred alone in....	2

In most of these some antiseptic dressing had been applied. From a close study of the diplococcus found in 86 of the cases and from the fact that inoculations into the ears of rabbits gave an erysipelatous inflammation, the author concludes that this organism is a common cause of erysipelas or a disease resembling it clinically. It is not attempted to name the bacterium in question.

950 Bacteriologic Examinations in a Diphtheria Epidemic. L. Cobbett. (*Jour. of Hygiene,* Vol. I., No. 2, 1901.)

In this study of a particular epidemic the point was brought out that there is no reason for thinking the pseudo-diphtheria bacillus is other than harmless for man. The relationship between the two could not be decided, and the author thinks that, even if laboratory experiments show that one can be transformed into the other, it must yet be shown that this can occur under natural conditions.

Actinomycosis. W. Silberschmidt. (*Zeitschr. f. Hygiene,* Bd. XXXVII., No. 3, 1901.)

A description with cultural and histologic findings in 7 cases of human and 2 cases of cattle actinomycosis is recorded. These cases showed localization as follows: One in the lung, 3 in the lacrimal canal, 1 upper maxilla, 1 floor of the mouth, 1 integument over back. Of these, the last 3 were typical cases of actinomycosis; the others showed that organisms resembling it were present. Animal inoculations made from the different cases showed that it was difficult to infect the animals. Infection in the few instances where it apparently was positive seemed to be simply inclusion of the foreign material with leucocytosis rather than an active growth of the organism. The organisms isolated and studied in cultures are divided into three groups:

1. Growth aerobic and at room temperature. The colonies on agar and blood serum are firmly attached to the substratum, and there is an abundant growth of mycelial threads in it. Gelatin liquefied. Threads long and fairly numerous.

2. The colonies are not attached to the substratum. Gelatin not liquefied. Short threads, many bacillary forms.

3. Growth anaerobic. Small sharply defined colonies, without mycelial threads, radiating from them. No growth on gelatin, nor at room temperature. Very short, fine threads. The opinion is held by the writer that a simple microscopic examination is not sufficient to establish a diagnosis. Cultures are necessary, both aerobic and anaerobic, and the isolation of the organism is not a matter of great difficulty. Mixed infection in human actinomycosis is not the rule. He would not venture a diagnosis between actinomycosis and pseudo-actinomycosis.

IMMUNITY AND SERUM REACTION.

Protective Bodies in the Blood. P. Ehrlich. (*Deutsche med. Wochenschr.*, Dec. 12-19-26, 1901.)

In this extended review Ehrlich elaborates his theories regarding immunity to his present understanding of this subject and especially takes up the various problems and differences between his theory and that of Buchner. The "side chain" theory is further established by observations as to the direct absorption or neutralization of poison bodies by tissue cells. The receptors and atom groups that hold and neutralize these poisons are now undoubtedly proved as coming from tissue elements. That they are not one and the same is evidenced by the highly specific combinations that occur. The presence of free detached groups of atoms more or less complicated, coming from structural substances of the tissues floating in the serum, and that are capable of binding poisons and keeping them from the cellular elements is the evidence of antitoxin and the basis of antitoxic immunity. The questions that arise, however, when living cells are under examination are much more complicated.

The bacteria dissolving power of sera as well as hemolysis can be shown to depend upon the presence and interaction of two bodies; one, the rather stable immune body,

as it is called, that is present in the serum of the immunized animal, and the other a more delicate body found in any normal serum, the complement. When an immune (bacteriolytic) serum is first obtained from an animal it is capable of dissolving bacteria placed in it, but, after a time, this property disappears. If new smaller amounts of normal serum are added to it, and such as have no action on the bacteria, its dissolving power is restored. The immune body and the complement then are inter-active in producing the phenomena of cellular dissolution. These groups of elements that are found normally in the serum of animals and that act like immune bodies in dissolving foreign cells or other bodies are termed "Hapline" groups. Many of these specific active bodies can be demonstrated. They are probably incidental to the processes of assimilation and may be considered as of two quite different meanings for the individual. One group can be of no importance such as exemplified by the dissolving power of goat's serum upon the blood cells of other animals, and the other variety that is capable of destroying bacteria that gain entrance either accidentally or in experiments to the tissue fluids. This group represents a definitely protective property.

A further point is brought out, in that the bodies known as complements (Alexin, etc.) are in themselves not injurious; it is only when they come in contact with cells saturated with amboceptors (immune body), that they may act as poison to their own species. Thus may be produced a condition of "horror autotoxicus" in which the immunization brings about certain destructive phenomena among its associated substances. An animal immunized against the parenchyma of an organ taken from the same species of animal acquires the property of dissolving such parenchyma cells from other animals of the same species but not those taken from itself. It has, therefore, produced an isotoxin and not an autotoxin. This line of investigation has opened a new view in pathology and diagnosis that will probably show good results.

Natural and Acquired Immunity. A. Wassermann. (*Zeitschr. f. Hygiene,* Bd. XXXVII., No. 2, 1901.)

Conclusions based on experimentation are presented. The complement exists in the living body. Its presence is the ultimate reason for some forms of natural immunity. It is not the general cause for natural resistance. In some instances, in natural immunity it is impossible to show the action of complement. During typhoid infection in guinea pigs the complement influences the acute, subacute and chronic progress of the infection. Specific action of bactericidal immune serum depends upon the union in the body of immune body and the complement. Large doses of the immune body increase its affinity for the complement. The complement has nothing to do with the action of antitoxic sera. Typhoid immunity in guinea pigs depends on the circulation of the specific bactericidal immune serum; it is, therefore, hemogenic and not histogenic. It was found impossible to continue the formation of complement for a long period. The complements are not alone bacterolytic and cytolytic bodies, but also general albumin-digesting ferments. These bodies are multiple. They are formed from leucocytes.

Immunity. Emmerich. (*Zeitz. f. Hyg. u. Infectionsk,* Bd. XXXVI., p. 9, 1901.)

Immune proteid. In regard to the practical production of this body Emmerich and Loew, following their experiments reported during the past several years, obtained the enzymes produced by B. pyocyaneus and B. erysipelatos suum and combined them with blood serum. The enzyme is first prepared by growing the bacteria on a rich though albumin free medium. The basis of this is asparagin and peptone with inorganic salts. This culture is allowed to grow until clearing appears, which is evidence of the presence of an agglutinating body; at the last the culture is shaken repeatedly. Finally the clear supernatant liquid is pipetted off and filtered. The filtrate is concentrated to 1-10 its volume in vacuo and dialyzed for 10-12 hours. It is then preserved with trikresol. This contains in solution "nukleasen." According to Emmerich the fluid so ob-

tained is curative for anthrax, diphtheria and typhoid, and will neutralize fatal doses of diphtheria toxin for guinea pigs. On account of the readiness with which "nukleasen" is broken up in the living body, it was sought by combining it with serum to obtain a more stable proteid combination. The pyocyanin solution was therefore mixed with ox serum to which .3 per cent sodium oxalate and .4 per cent potassium acetate had been added and the mixture was digested at 37° C. for 6 to 8 hours. The fluid thus obtained was not alone curative, but also had immunizing power against anthrax. It was also found by the authors that extract from fresh spleen could be used as a source of the proteid for their preparation.

The Multiplicity of Amboceptors and Complements in Hemolysin. H. Wendelstadt. (*Centralb. f. Bact.,* Bd. XXXI., Orig. No. 10, 1902.)

A goat was immunized simultaneously, with like amounts of ox, pig, and sheep blood by making repeated intraperitoneal injections. Before immunization, the serum of this goat would not dissolve the species of blood used. The immune serum of the goat was found to be active in causing dissolution (hemolysis) of the three species of blood used and approximately in like degree. When it was treated with ox blood, for example, the corpuscles of this species would be dissolved and the remaining fluid, after centrifuging, would be active for both pig and sheep blood, but no longer for new quantities of ox blood. The amboceptors in the goat serum were then of three kinds and each combined specifically with the blood of the same animal species. It was further possible to show that the action was not one and the same by determining the exact temperature at which the serum became inactive for the different blood species. It became inactive for all, ox, sheep and pig blood at 50° C. It was found that at 49.5° C. in 12 to 15 minutes it was lost for ox and sheep blood, but not for pig blood. The complement for pig blood was, therefore, more resistant to test than that for ox or sheep blood in this case. It was also shown that the addition of

varying amounts of acid to the serum of the immune goat caused a variable action on its dissolving power towards the species of blood then under study. As the acid was gradually increased, the serum became inactive towards pig and ox blood, but still retained its hemolytic property for sheep blood. It would here appear that the complement for this species was more resistant than that for the other two and was not identical with it.

The Effect of the Peritoneal Cavity upon the Hemolytic Properties of Sera. S. J. Meltzer. (*Centralb. f. Bact.,* Bd. XXX., No. 7.)

From the experiments of the author it is shown that the hemolytic activity of an immune serum is lost when it is retained in the peritoneal cavity of an animal for a period of 3 to 4 hours. Agglutinating power, however, is not lost and the hemolytic property of a serum so treated can be returned to it when a quantity of normal serum is again added. It would appear that there is an elective absorption of the complement in the peritoneal cavity.

The Importance of Salts in the Agglutination of Bacteria. E. Friedberger. (*Centralb. f. Bact.,* Bd. XXV., No. 8, 1901.)

With all the work that has been reported on this subject the main questions are still unsettled. The effects of 23 different crystalline substances were tested and it was found that, in the entire absence of such bodies, agglutination would not take place; that the rapidity of agglutination in dialyzed cultures was proportionate to the salt content of the liquid in which they were suspended; that the rapidity of beginning agglutination in bacterial emulsions was due to the proportion of NaCl present. Further it would appear that it is not by chemical action that salts influence the agglutination phenomena.

Immunity. Walker. (*Centralb. f. Bacteriologie,* Bd. XXIX., No. 10, 1901.)

Effect of anaerobiosis. Walker, in an extended study of the relative bacteriolytic activity of immune sera against cholera and typhoid under aerobic and anaerobic condi-

tions, makes the important observations that the effect of the serum is greatly increased under anaerobiosis. In all of his experiments there is evidence of a rapid destruction and even entire disappearance of the bacteria under study during 2 to 3 days anaerobic contact with immune sera while similar preparations exposed to air showed a uniformly increased growth in the same length of time.

Ocular Demonstration of the Action of Alexin. A. Pettersson. (*Centralb. f. Bact.*, Bd. XXX., No. 19.)

In conducting some special experiments, it was noticed that albuminous fluids would penetrate gelatin a variable distance when placed upon its surface. It was thought possible to demonstrate the activity of an immune serum by this principle.

Nutrient gelatin of 5 per cent strength was found most satisfactory. Test tubes containing this medium were inoculated, while melted, with a large number of typhoid bacilli and were then well shaken and solidified. Over the solid medium 5 or 10 c.c. of active serum was poured and the tubes set aside for development. In 6 to 8 days, inspection showed a clear area of gelatin 4 mm. deep just at the surface and under the supernatant serum, that was free from colonies. Below this, clouding from innumerable colonies was apparent. At the line between clear and cloudy gelatin, a somewhat increased evidence of growth was seen. The hemolytic action of a serum was shown by similar experiments. The melted gelatin had mixed into it blood of an animal and over the solidified mixture the active hemolytic serum was poured. In this case a clear line formed in the upper part of the gelatin where it was in contact with the blood serum. In this the blood corpuscles had been dissolved. As an example: A quantity of guinea-pig blood was added to gelatin; over this there was placed, after solidification, 5 c.c. of active ox serum, and observed for 8 days at room temperature. Gradually a clear area, 3 or 4 mm. in depth, formed and clearly marked the line of contact. In this area the blood cells were found dissolved.

Attention is called to the fact that in experiments made on these lines the effect of osmosis on account of salts present and the poor food value of active serum, as has been claimed by the opponents of the alexin theory, do not hold because the bacteria were in a highly nutritious gelatin medium.

The Intra- and Extra-Uterine Transfer of Antitoxin from the Mother to the Progeny. Roemer. (*Berl. klin. Woch.*, Nov. 18, 1901.)

Observations are presented on the antitoxin value of the various tissues of pregnant animals and the possibility of antitoxin passing to the young from the mother. The young from a mare and several guinea-pigs, which had received antitoxin injections at various periods before delivery, were tested immediately after birth for antitoxin. It was shown conclusively that, intrauterine, no antitoxin passed from the mother to the fetus because in each instance the fetus was negative, while the mother showed a greater or less number of antitoxic units present in the blood. As regards extra-uterine transmission of antitoxin, it was shown, from a study of some of the same animals, that a limited amount would pass to the young through the milk. The milk of the mother, however, always contained much less antitoxin than her blood serum, and the blood serum of the young, a still less quantity. As it is already known that absorption of antitoxin in full-grown individuals by way of the intestine is very slight or does not take place at all in some, a series of tests of absorptive power by this route was made. A number of guinea pigs and sheep were starved for a period of 24 hours, and then there was introduced into the stomach by catheter a liberal quantity of antitoxin. Both tetanus and diphtheria antitoxins were used. Some of the animals were killed and the intestinal contents and blood examined; in others the stomach was washed out and the feces collected. The antitoxin disappeared in a few hours from the stomach. An extremely small part was shown to have passed into the blood,

and a considerable part was demonstrated in the intestinal contents. One goat under experiment was observed for ten days. The feces were collected in 24-hour quantities, and tested separately. Up to the seventh day little antitoxin was apparent, after which, on the eighth and ninth days, an appreciable amount was demonstrated. In all of these experiments it was shown that the antitoxin was firmly united to the solid portion of the feces, because in the portions first extracted and centrifuged less was present than in later extractions.

The failure of antitoxin to pass through the placenta and the stomach and intestinal wall is attributed by the author to the indiffusible nature of the specific proteid in antitoxin. These results were based upon injections of both tetanus and diphtheria antitoxin, and show that both act in the same manner under circumstances such as described.

Agglutination of Bacteria. Loew. (*Centralb. f. Bacteriologie,* Bd. XXIX., No. 17, 1901.)

Loew believes as a result of his experiments that agglutinin is not formed primarily in the serum of the immune animal but that it is derived from the bacteria. In the body of the animal, it is combined with albuminous bodies and thereby becomes more stable but somewhat reduced in activity. It is this combined enzyme-proteid that causes agglutination and disintegration of bacteria.

Pseudo-Clumping in Cultures of the Typhoid Bacillus. W. G. Savage. (*Jour. Path. and Bact.,* page 388, 1901.)

Too alkaline media have been mentioned as a cause.

Presence of foreign bodies acting as mechanical debris is an insufficient cause for spontaneous clumping.

Horton Smith says: "The seeming agglutination can only be due to the fact that during their growth the bacilli have been acted on by some body, which they themselves have produced, and which has so altered them that they cohere."

Most observers have found that pseudo-clumping is more marked in old cultures. Pseudo-clumping never occurs

in other than broth cultures. Author disproves that a secretion of the bacillus is the predominant factor in pseudo-clumping.

Only certain races of bacillus typhosus show this false clumping; others never or rarely ever show it. The susceptibility of the race of bacillus typhosus is the more important factor. The constitution of the broth is the next most important.

A Study of 1,650 Blood Examinations for the Widal Reaction with Special Reference to So-called Partial Reactions. R. J. Wilson. (*Medical News,* July 20, 1901.)

In the examination of the number of blood specimens noted, it was found that 160 specimens gave partial reaction. The effect of the serum in these was not uniform and caused irregular agglutination with partial motility persisting. An analysis of this group from clinical records showed that 37 cases occurred in private practice, of which 20 were called typhoid; 1 was a walking case, 2 mild, 15 ordinary and 1 protracted. Thirteen were not typhoid, 3 no diagnosis, 1 grippe, 3 intermittent, 1 fecal impaction, 1 indigestion, and 1 enteritis. Of the 123 cases in hospitals there were no records for 56; the other 67 showed 8 typhoid, 15 not diagnosed, 10 tuberculosis, 16 malaria, 1 pleuritis, 1 nephritis, 2 anemia, 1 pericarditis, 1 gonorrhea and 1 submersion. Less than 7 per cent of the partial reactions were found in typhoids in hospital cases; they occurred with greater frequency in the cases of tuberculosis and malaria. As far as the partial reaction is concerned, its value is absolutely *nil* to the clinician and can only indicate the necessity of a re-examination.

Serum Agglutination in Tuberculosis. R. Koch. (*Deutsche med. Woch.,* Nov. 28, 1901.)

The culture used is prepared in the following manner: A growth of bacillus tuberculosis on the surface of broth is collected and pressed firmly between filter paper, so that all attached drops of fluid may be removed. A definite amount, about .2 gram, of this is weighed out and placed in an agate mortar. It is now rubbed briskly with the

addition, drop by drop, of a 1-50 normal soda solution. Gradually more of the soda solution is added, until the proportion is 1:100, or .2 gram bacilli to 20 c.c. solution. The object of this treatment is to thoroughly separate the bacilli from their close attachment one to another. The thick mixture is centrifuged for several minutes, and the supernatant fluid pipetted from the sediment. Neutralization with weak hydrochloric acid to a slight acid reaction is now accomplished, after which the fluid is further diluted by the addition of normal salt solution, containing .5 per cent carbolic acid. The result is an almost clear fluid, which in certain lights gives a slight opalescent appearance. Examined in the hanging drop, the bacilli that are present will be found single or at least in very inconspicuous groups. Carbolic acid is necessary as a preservative, because of the time that specimens must remain in the incubator.

If an active immune serum is added to this suspension of tubercle bacilli in dilutions 1:1000 to 1:3000, the reaction will be noticed developing, if the tube is held in the hand or in the incubator, within a few minutes, and gradually comes to completeness in 12 to 24 hours. At first the fluid becomes more cloudy and then small flakes are seen depositing, until finally a fairly abundant sediment has deposited and the supernatant liquid is perfectly clear. In the tests presented, the serum is diluted so that it is 1:10, 1:25, 1:50, etc., as regards the test fluid. For the higher dilutions, over 1:1000, the serum is diluted before being added to the test fluid. Experiments with the serum of guinea-pigs inoculated with tuberculosis, and from persons, are presented. Six persons, among 30 non-tubercular, showed the reaction; 4 of these in a dilution of 1:25, and one, a case of muscular rheumatism, in dilution of 1:50. Among 78 cases of tuberculous phthisis, one case showed agglutination 1:50, 4 at 1:25, while the others showed serum inactive in dilution at 1:25. In a special retest of 38 cases of tuberculosis for an agglutination at 1:10, it was shown that only 14 of these gave a positive result.

These results show that it is not possible to distinguish clearly between cases of tuberculosis and the non-tubercular by means of the serum reaction. A comparative test of the blood serum of animals undergoing immunization against tuberculosis, as well as persons who were receiving tuberculin injections, is also presented. The results obtained here do not show any relation between the agglutinating power of the serum and the degree of immunity attained, or any proportional value to the amount of tuberculin injected. This would further prove the failure of the test as a practical method of diagnosis.

Serum Diagnosis in Tuberculosis. Beck and Rabinowitsch. (*Zeitschr. f. Hygiene,* Bd. XXXIV., No. 2, 1901.)

The serum test was applied in 78 cases of cattle that were slaughtered and the diagnosis established by the post-mortem findings. Seventy-eight animals were tested, and the reaction in varying degrees of dilution was demonstrated in both diseased and healthy animals. Among 19 healthy animals, it was only absent in one instance. Three of these gave positive results, in 1:20, 1:30 and 1:40 dilutions, respectively. For 16 animals with advanced tuberculosis it was absent once, in 4 positive, 1:5, 5 at 1:10, 5 at 1:20, and 5 at 1:30 dilution. The test was shown to be unsatisfactory in this series of observations, even when its occurrence as regards degree of dilution was considered. It would seem that these results simply confirm those made on the human subject, and show the inutility of the test.

Preventive Inoculation in Typhoid. A. E. Wright. (*Lancet,* Sept. 14, 1901.)

Wright made observations on the variation of bactericidal power of the blood during immunization against typhoid. It was shown that where the antityphoid vaccine caused constitutional symptoms there was a decrease in bactericidal power, with an increased susceptibility to typhoid infection. This condition is later, 3 to 4 weeks, replaced by one of increased resistance. When the antityphoid vaccine caused very severe symptoms, the decreased or negative phase of susceptibility appears quickly and is

very pronounced and may never be followed by a positive increase in resistance. When the injections cause little or no constitutional symptoms, the positive phase of increased resistance appears in about 24 hours and a negative phase may be absent. From a practical standpoint it would therefore be advisable to begin immunization with relatively small doses, at least small enough not to cause constitutional symptoms. Such primary inoculations should in all cases be followed by second inoculation with increased amounts of vaccine. These observations follow the results that have been noted during immunization in the preparation of antitoxin, and are probably based on the same principle. For some special classes of cases, Wright suggests that in patients recovered from typhoid in whom the bactericidal power is less and where re-exposure is possible, the resistance should be raised by an appropriate injection. On the other hand, where there is increased bactericidal power present it would seem impracticable to further increase this power. Where there is doubt as to the efficiency of a vaccine, its value can always be shown by its action on the bactericidal power of the blood.

Cholera Immunity. Ascher. (*Central. f. Bacteriology,* Bd. XXIX., No. 4, 1901.)

From a study of the agglutination produced in the serum of rabbits by injection of cholera vaccine, Ascher concludes that the agglutination produced does not follow the size of the dose given. It is not proportionate. The size of the dose of vaccine, in developing immunity, is therefore not a matter of great importance, and, indeed, small doses can give the same results as given by those relatively larger. In all instances in the author's experiments a considerable difference between unvaccinated and vaccinated animals as regards the agglutinating power of their sera was noticed.

Agglutination in Infections of Differing Grades of Severity. S. J. Goldberg. (*Centralb. f. Bact.,* Bd. XXV., No. 16.)

Experiment animals were inoculated with cultures of differing virulence and the blood tested comparatively for

its agglutinating activity. When the infection is rapidly fatal, there is no change in this regard. Non-fatal infection causes increase in agglutination, but shows wide variation in different animals. There is a gradual rise in power up to a certain maximum after which it gradually returns to normal. In the immunization of animals against typhoid infection, the agglutinating power of this serum gradually increases, but not in proportion to the degree of immunity established. The appearance of this property is an early evidence of the presence of protective bodies.

METHODS. CULTIVATION. STAINING.

Isolation of Typhoid Bacilli from the Stool. Drigalski and Conradi. (*Zeitschr. f. Hygiene,* Bd. XXXIX., No. 2, 1902.)

A special culture medium similar to litmus agar is described. Agar containing 2 per cent peptone and 1 per cent nutrose is first made. To this is added 130 c.c. of litmus solution, each litre containing 15 grams milk sugar; 2 c.c. of a 10 per cent soda solution are now added, and finally 10 c.c. per litre of a "Krystall violett B. Hoechst" (1 gram per 100 c.c. water) solution is added. This medium, when solid, is very firm. A series of plates is prepared from the discharges of the suspected case; either the stools or urine can be used. The medium is poured out into Petri plates, and allowed to harden. Over the surface the material to be examined is spread out with the aid of a glass rod bent at a right angle. This must be done evenly and carried far enough to insure the separation, so that colonies will surely appear. The plates are allowed to remain open for about half an hour, so that the surface may become dry. They are then placed in the incubator. In 14 to 16 hours at this temperature the colonies can be distinguished readily. Those of bacillus coli are 2 to 6 mm. in diameter, dense and distinctly red. A red area often appears around the colony. Different species of this group gave the same general characters.

Typhoid bacillus colonies show a diameter of 1 to 3 mm., seldom larger. They have a smooth, dew-drop-like appearance. Other bacteria give red colonies, but none like those of typhoid. Identification must now be verified by fishing off the typical colonies and planting them on other media, and applying the serum test. The rapidity of separating and identifying typhoid by this method is considered one of its most important features. In applying the method practically, it was shown to yield good results in 18 to 24 hours. In some cases where the clinical picture did not indicate typhoid, the bacillus was isolated.

Isolation of B. Typhosus by Means of Piorkowski Method. Peppter Inaugural Dissertation. (Erlangen, 1901.)

This method of isolating and identifying typhoid bacilli was tried on mixtures of colon and typhoid bacilli and on the discharges of suspected cases. The conclusion is reached that the method has some value but is not certainly positive. The very successful results reported by Piorkowski are considered as being due to the fact that examination of the colonies was considered sufficient evidence for the differentiation. In testing the method for the examination of water it was shown that a number of species resembling B. typhosus were isolated, that were found upon more extended cultural study to have wide differences from this organism.

Typhoid Diagnosis by Remy's Method. Page. (*Boston Med. and Surg. Jour.*, No. 19, 1901.)

In the examination of 23 cases of typhoid by 31 tests, the typhoid bacillus was demonstrated in each instance. As early as the third day and as late as the forty-fifth day, bacilli were found. In three cases, the diagnosis was established by this method before the Widal reaction was positive. Control experiments on other cases were negative. All cultures must necessarily be identified by supplemental cultural tests. Earlier than the third day one cannot expect to obtain results.

The Isolation of the Typhoid Bacillus. A. Moore. (*British Med. Jour.*, March 22, 1902.)

Use is made of the effect of an immune serum in restraining activity upon the part of B. coli and allowing B. typhosus to grow away from it. A glass tube bent in W shape is filled with gelatin containing Perietti solution and a few drops of rabbit serum previously immunized to colon bacilli. If one arm of the tube is inoculated with a mixture of the two organisms and placed in the incubator, rapid growth takes place and the actively motile typhoid bacillus finds its way along the melted medium into the other arm of the tube. It was found that typhoid would appear in pure culture from mixtures in 21 hours. Water was inoculated and the typhoid bacillus separated by this method.

The Identification of the Colon Bacillus by Reactions Produced in Culture Media Containing Neutral Red. R. C. Rosenberger. (*Philadelphia Med. Jour.,* March 8, 1892.)

The term "neutral" applies to the hue of the basic color neutral red when in solution and not to its chemical composition. Its neutral red tint is changed to bright red by acids, and yellow by alkalies. Hunter[1] claims that the presence of B. coli can be detected in water by simply inoculating the water on this medium and obtaining the fluorescence and yellowish color that is considered characteristic. The results of a number of organisms grown on this medium are given. The method, as detailed, consisted in the use of ordinary peptone agar to which 5 drops of a watery solution of the dye was added in tubes containing each 15 c.c. agar. This was used as slant agar. Inoculation was made on the surface and the reaction noticed in from 24 hours to 5 days. Cultures and controls were mostly incubated at 37° C. The glucose bouillon was prepared in the same way. In all, 13 stock cultures of B. coli communis were tested as shown in the tabulation. Seven of these gave the reaction on agar and one on bouillon. The reaction was also given by B. fluorescens liquefaciens in both agar and bouillon. B. prodigiosus and B. alcaligenes were positive in bouillon, but not on agar. The author re-

(1) Microtomists Vade Mecum, 5th Ed., 1900.

ports the results with the more important pathogenic and non-pathogenic organisms, including the typhoid bacillus, from which it is shown that none of these cause the reaction, although many caused fading of the color.

In the conclusions it is stated that neutral red agar is a valuable differentiating medium for B. coli, but that the reaction cannot be considered as specific. The typhoid bacillus is negative to the typical reaction. In the examination of water this test alone is not to be depended upon, as several very common water bacteria give the same reaction.

The Use of Eggs as a Medium for the Cultivation of Bacillus Tuberculosis. M. Dorset. (*American Medicine*, April 5, 1902.)

Cultivations from the tissues of animals having tuberculosis were made on media composed of the whole egg contents mixed, the yolk separated, and on the white alone. Hens' eggs were used. The egg albumen was shaken and filled into tubes and hardened and sterilized after the manner of serum media. The white of eggs was found alkaline and the yolks acid to phenolphthalein. When the entire egg was used the medium was slightly acid to this indicator and required 1 or 2 per cent normal soda to neutralize it. The best results were obtained on the whole eggs, the yolks gave slower growth and the whites were found unsuitable. Colonies appear in 10 to 14 days as round, white, slightly elevated points all over the surface.

Cultivation of Gonococci. H. Wildbolz. (*Centralb. f. Bact.*, Bd. XXXI., Orig. No. 4, 1902.)

The writer reports results of cultivation of gonococci on various media and comes to the conclusion that coagulated blood serum is the only satisfactory medium for the cultivation of gonococci. He found further that it was always possible to transfer viable cultures to agar after having grown them upon human blood serum.

Flagella Staining with "Night Blue." L. Smith. (*Jour. Med. Research*, June, 1901.)

For staining of flagella only fresh cultures should be used, and cover-glasses must be absolutely clean. Reagents: Potass. alum, 1 gram; Dist. water, 40 c.c. Leave in the incubator over night. Dissolve 5 grams night blue in 20 c.c. absolute alcohol; mix the two solutions, filter, and use at once. The evenly spread film of bacteria can be fixed by heat. Stain five to ten minutes, wash in water, dry and mount.

The Demonstration of Flagella. A. Peppler. (*Centralb. f. Bact.*, Bd. XXIX., No. 8, 1901.)

After trying most of the methods that have been proposed for this purpose, and being often confronted by absolute failure, the author devised the following modified method:

Mordant.

I. Tannin .....20 gram.
Water .....80 gram.

Dissolved by heat and cooled.

II. Chromic acid .....2.5 gram.
(Free from sulphuric.)
Water .....100 gram.

Fifteen per cent of No. 2 is added to No. 1, with constant stirring, and in small amounts. The mixture stands four to six days, and is filtered. *Spoils if cold.*

Method: Mordant. Two to five minutes. Wash in water lightly. Stain with carbol-fuchsin, or carbol gentian violet. Wash and mount.

Micro-organisms in Vaccine. M. Funck. (*Centralb. f. Bacteriology.* Bd. XXIX., No. 24, 1901.)

In an experimental study of the cause of vaccinia and variola, and from an extended literature review it is proposed:

1. Vaccinia is not a bacterial disease.
2. It is caused by parasitic protozoa.
3. The inoculation with "sporidium vaccinale" causes vaccinia in calves.
4. Such inoculations give immunity against vaccinia.

5. Variola is caused by the same protozoan.
6. The resistance of the organisms in vaccine virus and variola virus is the same.

When vaccine lymph is treated with glycerin as an emulsion, in the course of two or three months all bacteria are killed and cultures will show the fluid to be sterile. Vaccination with such sterile vaccine gives typical results showing that the bacteria that were originally present are not the cause of the result. The author finds protozoa present in the lymph of the vaccine vesicle, in the smallpox vesicle and in glycerinated, sterile vaccine. When stained preparations are made from such material, numbers of round or oval clear areas are seen that fail to take the stain; these indicate the locations of the organism. The most satisfactory demonstration is made of the fluid material by adding a small portion to a drop of bouillon on a cover-glass and examining it directly as a hanging drop. The organisms are found particularly in the dependent part of the drop. Two forms are described; a cyst form, filled with spores and the free spores. Such spore cysts are round or oval, 25 microns in diameter. They are sharply defined and can be seen to be full of spore-like bodies. The spores, when free, are numerous, have somewhat irregular outline, are highly refractile and ameboid and measure 1 to 3 microns in diameter. When hanging-drop specimens, made as described, are placed in the incubator at 37° C. growth of the bodies can be seen. In addition to these are sometimes larger bodies to be seen which are probably epithelial cells that have been attacked by the organism and almost completely filled with resulting growth. In the glycerin vaccine emulsion these are not seen because of the mechanical disturbance in its preparation. Inoculation experiments on calves were made with this organism and typical results obtained. In order to obtain the sporidium vaccinale in practically pure culture the following procedure is necessary. A few drops of glycerinated vaccine, that has become sterile as shown by cultures, is placed on the surface of agar, solidified in the bottom of a Petri dish. This is

spread out evenly and placed under the low power microscope objective. The protozoa can now be seen on the surface of the agar. It is possible to pull them out of the liquid by fishing with a very small platinum spatula, 1-10 mm. wide. The organisms thus obtained are transferred to beef broth and filled into capillary tubes for inoculation experiments. The calf is inoculated in the usual manner, a scarification is made on a shaved area and the emulsion of organism in the broth is applied by rubbing into the scratches. The author reports it possible by repeated reinoculations to obtain the organisms in a much purer and typical condition. The calves used in these experiments were subsequently shown to be immune by attempted vaccination after the ordinary methods. Fluid taken from smallpox pustules showed that the same organism was present. A life history study from the spores is recorded. When material containing spores is placed in the incubator, there will be seen in 48 hours an enlargement of individuals to a diameter of three times that of the spores (these 1 to 2 microns), some even attain a size of 8 to 10 microns. On about the tenth day the larger organisms show a granular appearance and soon become filled with small, round refractile bodies.

Cultivation of the Vaccine Organism. T. Ishigami. (*Centralb. f. Bact.,* Bd. XXXI., Orig. No. 15, 1902.)

The author has studied vaccine and smallpox critically for a number of years, and isolated every possible bacterium from many specimens. All experiments with cultures thus obtained show that they bear no relation to the specific phenomena. Vaccinia and smallpox are, therefore, not of bacterial origin. Later in the prosecution of simple microscopic studies of the lymph and early changes in vaccine and smallpox pustules, he arrives at the conclusion that the organism is a protozoan, and can be seen in the lymph and the epithelial cells. Early in its development in the pustule it is actively ameboid, and later invades the epithelial cells and forms cysts containing many spore-like bodies. The life history changes can be followed if the speci-

mens taken are kept in the incubator. A more exact study can be made by using a medium obtained from vesicles, that appear on various parts of the body of calves when an intravenous injection of sterile vaccine lymph is made. These vesicles are not so readily infected from the skin as those made by scratching, and will be found, in most instances, at least before becoming pustular, to be free from bacteria. The lymph taken from such vesicles can be placed in the incubator in hanging drop preparations, and the complete cycle of development can be studied. It is concluded from the appearance and development of the organisms studied that the causal agents in vaccinia and smallpox are one and the same. It was possible to carry on a kind of pure culture by the method proposed, and animals inoculated with the lymph containing the sporozoa regularly developed typical vesicles, in which the organism could again be found.

A New Method of Applying the Rabies Test. C. F. Dawson. (Second Meeting Soc. American Bacteriologists, Baltimore, Dec. 27, 1900.)

The method of inoculating rabbits for rabies by way of the optic foramen in place of the usual trephine operation is proposed as being superior and more easily applied. The brain emulsion of the suspected animal is injected by a fine hypodermic needle that is passed through the orbital tissues into the optic foramen under the brain. It is less dangerous to the experiment animals. A series of comparative tests showed that this method is fully as satisfactory as the older procedure.

Hydrophobia. T. Oshida. (*Centralb. f. Bact.,* Bd. XXIX., No. 25, 1901.)

Inoculation of animals by way of the optic foramen is strongly advocated. To obtain the spinal cord the author removes a section of the spinal column and straightens it out so that a wire or glass rod can be pushed through the canal. The end of the rod is protected by a small bunch of sterile cotton. In this way an almost intact section of the cord can be pushed out of the canal.

SECTION IV.

HYGIENE.

The Effect of Human Gastric Fluid upon the Spirillum of Cholera. Schultz-Schultzenstein. (*Centralb. f. Bact.*, Bd. XXX., No. 21.)

Acid solutions and pepsin in varying strength were tested for bactericidal activity upon cholera organisms. It was found that .05 per cent hydrochloric acid was the least amount that would kill them in 6 minutes when simply in water. Pepsin and traces of acid caused restraint of activity and some granular degeneration of the bacteria. Pepsin in the presence of hydrochloric acid to the amount of .019 per cent caused the death of cholera.

If 600 c.c. of water are placed in the normal stomach of man, in 75 per cent of the cases it will become acid to the extent of .03 per cent HCl in the course of 12 to 15 minutes. Such water upon removal from the stomach will kill cholera in 15 minutes. When food material, as albumens or peptones, are present in considerable amount, the action is uncertain and requires as much as .097 per cent to .217 per cent HCl with a period of 1 hour for a positive killing effect upon these bacteria.

Transmission of Pathogenic Germs by Flies. J. Manning. (*Jour. Am. Med. Assoc.*, May 17, 1902.)

Experiments were made to show that bacteria can be carried by flies from place to place. The following organisms were used: B. pyocyaneus, staphylococcus pyogenes aureus, B. typhosus, B. coli communis, B. prodigiosus, sarcina aurantiaca, sarcina alba and mould and fungi.

The results indicate certainly such transmissibility and the retention of bacteria for a considerable time upon the feet and bodies of flies.

Bacterial Contamination of Milk of Cities. W. H. Park. (*Journal of Hygiene,* Vol. I., No. 3, 1901.)

The results of a study of the bacteriology of the milk supply of New York City are presented. Owing to the conditions existing on most dairy farms, and the long distances that city milk is shipped, it is subject to many dangers as regards its bacterial content. An average of 5,933,500 bacteria per c.c. was found in one series of tests of milk received under ordinary conditions. Samples collected in shops in poorer parts of the city gave as high as 13,000,000 bacteria per c.c., and the condition of such a supply when it reaches the homes of poorer persons, and where it is kept at the temperature common in these houses, may well be surmised. Temperature is an important factor as regards bacterial content. The increase at various temperatures is shown. At 90° F., a temperature found in some of the cars on milk trains, the number of bacteria changed in the same sample from 5,200 to 654,000 in eight hours. The degree of cleanliness in the collection of milk is also shown as a most important factor in keeping down the number of organisms. The question of the harmfulness of such milk is discussed, but not decided. It is, however, suggested by the writer that a dairyman can, with reasonable care, deliver milk 24 to 36 hours old that will not contain over 50,000 to 100,000 bacteria. Milk containing more than this should not be sold.

Because of the time required to make cultural tests, it is impossible to prevent the sale of milk found impure. By a gradual and continuous examination by cultures, it is possible to locate the impure part of the supply, and to locate the difficulty or fault in production, so that it can be remedied in time.

Experiments on the Relation of the Cow to Milk Diphtheria. Geo. Dean and Chas. Todd. (*Jour. of Hygiene,* Vol. II., No. 2, 1902.)

An outbreak of diphtheria was observed where a pathologic condition existed on the udders of the cows from

which the milk came. Two cows had ulcers on the teats from which diphtheria bacilli were cultivated. The virulence of these bacilli and the specific nature of the toxin that they produced was demonstrated by animal experiments. The separate cultures obtained from the cows, the milk and the throats of the patients were all virulent and upon making comparative experiments were shown to produce toxin of approximately the same degree of intensity. Diphtheria antitoxin acted promptly and favorably for guinea-pigs when used against each strain of bacilli. The evidence of transmission of the bacilli by the milk is clear, as certain individuals who used the milk after sterilization escaped infection. The udders of 13 other cows were examined at the same time for the specific bacillus. None were found, but several organisms resembling diphtheria were isolated. These showed in the animal experiments that they were without virulence and probably had nothing to do with the epidemic.

Pathogenic Microbes in Milk. E. Klein. (*Journal of Hygiene,* Vol. I., No. 1, 1901.)

The author reaches the following conclusions from the bacteriologic and microscopic examination of milk samples obtained in an investigation made for the Medical Officer of the London County Council:

Seven per cent of the samples of "country" milk produced typical true tubercle in the guinea-pig.

Eight per cent of the samples of "country" milk produced typical pseudo-tuberculosis (non-acid fast bacillus of pseudo-tuberculosis, A. Pfeiffer).

One per cent of milk samples produced diphtheria in the guinea-pig, yielding the typical true diphtheria bacillus.

One per cent of milk samples caused a chronic disease (in most cases with fatal results), due to a pathogenic torula, apparently differing in cultural and physiologic characteristics from the torula (pathogenic blastomycetes) obtained by Sanfelice, Plimmer and others from human cancer.

Out of the secretions of the cow's udder two pyogenic microbes were obtained: *Bacillus diphtherioides* and *streptococcus radiatus* (pyogenes).

Dry Points Versus Glycerinated Virus, from a Bacteriologic Standpoint. M. J. Rosenau. (*American Medicine,* April 19, 1902.)

A comparison of the number of bacteria found on dry vaccine points and in glycerinated lymph is presented. Leaving aside the question of cause of infected tubes, it is recognized theoretically that glycerin in proper amount inhibits and destroys many species of bacteria in time, so that at a certain point a given product will be relatively free from bacteria, pus cocci, and still be efficient clinically. In all, 92 samples purchased in the open market and coming from 8 manufacturers were counted; 41 were dry points and 51 were glycerinated. The Petri plate method was used. The results gave an average of 4,807 bacteria per dry point and 2,865 bacteria per glycerinated tube. The results for kinds of bacteria showed that various micrococci of suppuration were present in both varieties. Several short rods, very virulent for laboratory animals, belonging to the hemorrhagic septicemia group, were found in the dry points. All examinations for tetanus were negative. It is believed that the impurities found in glycerinated virus on the market are largely due to an over-confidence in the germicidal value of glycerin.

The opinion is advanced that the difference in numbers of bacteria found does not justify the confidence in glycerinated virus over dry points as found upon the market, judging from the limited number of counts made. As to kinds of organisms, it was shown that pus cocci were present in both. Some of the glycerinated virus on the market is green, that is, has not been a sufficient length of time in contact with glycerin.

Tetanus and Vaccination. J. McFarland. (*Jour. Med. Research,* May, 1902.)

A consideration of a number of cases of tetanus following vaccination is presented. In some instances there is no doubt but that the vaccine is infected with tetanus bacilli.

Infection may come from the manure or hay of the stables and on this account the greatest care should be exercised in the preparation of the product.

Colon Bacilli as an Index of Stream Purification. E. O. Jordan. (*Jour. of Hygiene,* Vol. I., No. 3, 1901.)

The observations reported are based upon the investigation, undertaken for the Sanitary District of Chicago, of the waters of the Illinois and Michigan canal and the Illinois river in their flow from Chicago to the Mississippi. Tabulations of results are given, made up from samples collected at various points along the flow and for a period of about a year. The number of colon bacilli present as determined from this large number of samples was found to decrease until a point above Peoria is reached, and again to the mouth of the Illinois river. At these points little variation during the period was demonstrated and the numbers found closely approximated the findings for the tributary streams. At the outflow from Chicago, tests showed bacilli present in dilutions of 1-100,000 and 1-1,000,000, indicating the enormous number present in the river sewage before its flow. At Averyville and Grafton, the bacillus was rarely found in dilutions of 1-100; in about 40 per cent of the examinations in dilution 1-10, and in 1 c.c. amounts in approximately 75 per cent of the tests. In a flow of 27 miles from Lockport to Morris, a loss of 9-10 of the bacilli present at the former point is demonstrated. In other stretches of the river, inflowing streams influence the conditions, but the general evidence of purification is very conclusive. The causes of purification are discussed. Other conditions than those simply of time and sedimentation must be operative. Season was not shown to influence the findings very much. However, there was an increase in some instances during February and March when the streams are swollen by heavy rains. On the supposition that the exhaustion of food supply or the accumulation of harmful products is the cause of a certain disappearance of bacteria from streams, the effect of flood time may be readily surmised.

Sterilization of Catheters. Nancrede and Huchings. (*Medical News,* Nov. 23, 1901.)

The following practical points were determined by Nancrede and Huchings as a result of 65 experiments. An infected rubber catheter requires at least 4½ minutes' boiling to sterilize it. Mechanical cleaning assists and shortens the required time for sterilization. English web catheters can be repeatedly boiled without injury. Immersion in 1-2,000 mercuric chlorid for 5 minutes does not sterilize any variety of catheter that has become infected. It only inhibits the growth of bacteria. Bichlorid should not be used for catheters that are to be retained unless immersion can be continued for a long time. Washings in solutions of antiseptics are of no value. Formalin vapor was found by the authors to sterilize in 24 hours, but a shorter period of exposure was not determined. Practically all methods used should be given more time than the laboratory experiments would indicate. It would seem that English web catheters can be more readily sterilized than rubber catheters, by heat, probably because of their interior construction.

SECTION V.

ANATOMY.

A Nasal Bone Deformity. W. L. H. Duckworth. (*Jour. Anat. and Physiol.,* April, 1902.)

The author calls attention to a left nasal bone (in an ancient Egyptian skull) of unusual length, extending downward to the level of the inferior turbinated, thus leaving but little space between the nasal bone and the premaxilla. Two explanations are given for the occurrence and the essayist leaves the reader to choose. (a) Extension of ossification from the nasal bone to an unusual extent downward; (b) unusual extent of ossification in the premaxilla upward.

Comparative Embryology of the Adrenals Concerning a New Normal Organ in Man and Mammals. Von Otto Aichel. (*Archiv. fur mikroscopische Anatomie und Entwicklungsgeschichte,* Bd. LVI., Heft I.)

Résumé. The interrenal bodies of the lower vertebrates develop from the urinary funnel and correspond to the accessory kidney of the higher vertebrates. The suprarenal bodies of the lower vertebrates develop from communicating channels (Guerkanstein) of the Urkidney and correspond to a part of the so-called accessory bykidneys of the higher vertebrates. There are, therefore, two entirely separate accessory kidney systems. Aichel was able to prove that the round, the Epoophoron and Paroophoron situated accessory kidneys develop in this structure and are normal organs of men to which he gives the name of Marchand's accessory kidneys.

The Diaphragm and the Phrenic Nerve. W. E. Schroeder and F. R. Green. (*American Journal Medical Sciences,* February, 1902.)

The authors announced the following conclusions:

(a) The diaphragm is not an essential muscle of respiration;

(b) Symptoms commonly described as caused by irritation of the phrenic nerve were absent in operations and experimental work;

(c) The intercostal nerve-supply of the diaphragm is secondary to the phrenic and insufficient to carry on the action of the diaphragm after a division of the phrenic;

(d) Division of the phrenic nerve, causing an atrophy of one-half of the diaphragm, might be followed by a diaphragmatic hernia;

(e) Division of one phrenic in man resulting in paralysis of one-half of the diaphragm only, is not necessarily fatal.

The diaphragm, like the sterno-mastoid, rectus abdominis and other muscles, is a polymeric muscle. Where muscles extend over more than one myotome they receive nerves from more than one neurotome. The phrenic, as pointed out by the authors, is the principal nerve of the diaphragm in man, while phrenic branches of the intercostal nerves are secondary, but the number of these secondary nerves is in the nature of things inconstant, since there is no known immutable level to which the diaphragm, in its migration from the neck, must travel. Neither is there necessarily in any two cases the same number of segments involved in the attachment of the diaphragm to the chest walls. It should further be remembered that each spinal nerve conveys gray rami communicantes for the supply of involuntary muscular fibers, glands, etc.; the phrenic being a spinal nerve, forms no exception then to a general rule. It goes without saying that the various serosæ continging the diaphragm must receive branches from the phrenic nerve; hence, whether a particular dissection reveals these branches or not, we should not doubt their presence, any more than would we question the validity of the general law regarding the distribution of articular nerves, simply because a single dis-

section failed to reveal them. In other words, let us encourage anatomic axioms. The paper above referred to is one of the most valuable contributions of the year to practical anatomy.

The Hemolymph Glands. Watkin. (*American Journal of Anatomy*, Nov. 7, 1901.)

The author says: The earliest mention of these glands was in 1857 by Leydig, by whom they were described as splenic in character and occurring in many mammals along the thoracic aorta. Leydig also described transition forms between these and ordinary lymphatic glands. The essential feature of a hemolymph gland is a sinus containing blood instead of lymph.

These glands are more easily recognized in early adult and middle life than in infancy or old age, a circumstance due probably to greater numbers, at these periods. In the new-born their discovery is a matter of microscopic examination. In late life the glands atrophy. They are found in greatest numbers in the neighborhood of the renal and adrenal arteries; in the root of the mesentery and along the pelvic brim; in the prevertebral, retroperitoneal and cervical regions. Normally, they are rarely found in the mediastinum or along the thoracic vertebræ, but in cases of anemia with general enlargement of the hemolymph glands, these regions present large numbers.

In the human being the hemolymph glands usually lie deeply imbedded in fat or connective tissue, and, as a rule, near some large vessel; they are deep red or bluish in color, and may be mistaken for hemorrhages or congested lymph glands, from which latter it is often difficult or impossible to distinguish them. When the blood sinuses are small, the gland cannot be distinguished macroscopically from ordinary lymph glands, hence in these cases precision lies in a microscopic examination.

On cross sections, the blood sinuses of the hemolymph glands resemble spleen pulp. Small, round, whitish masses of lymphoid tissue often project into the pulp-like peripheral sinus, suggesting splenic follicles. Subcapsular red

streaks radiating toward the center of the gland is a very important point in the naked-eye diagnosis of these organs.

The hemolymph glands vary in size from pin-point to that of an almond, the usual size being that of a yellow mustard seed or pea. In shape they are round, oval, flattened, elongated or comma-curved, and each usually possesses a hilum through which vessels pass. They are usually softer than ordinary lymph-glands. Usually relatively large plexuses of vessels are attached to the gland. No lymph vessels can be demonstrated in pure hemolymph glands; but in glands of mixed type vessels can be demonstrated.

The number of hemolymph glands in the retro-peritoneal region varies from 200—500. The relative proportion of hemolymph glands to ordinary lymphatic glands is from 1—20 to 1—50. In man many of these glands are in a state of rest and become enlarged under certain pathologic conditions. A new formation of these glands in compensation for spleen or bone marrow is also possible and doubtless occurs under certain conditions.

In his summary of the hemolymph glands, the essayist says: (a) Our conceptions of lymphoid tissue are greatly aided by the study of the hemolymph glands; (b) the red marrow is the most primitive type of lymphoid structure; the ordinary lymphatic glands are the most highly developed and the hemolymph glands and spleen occupy intermediate positions.

Symelus. A. McDermid. (*Trans. Chicago Gynæcological Society,* 1900.)

The author reports a case of this malformation. The specimen was dissected by Eckley, and exhibited at Saratoga, June, 1902.

McDermid calls attention, (a) to the fusion of the entire lower extremities and to the deformity involving the pelvis; (b) to the possible absence of anus and external genitals (as in this case) due to very close fusion; (c) to rotation of limb so that the anterior surfaces lie pos-

teriorly; (d) to the reversed flexion of the knee; (e) to the outward rotation in front and the absence of a foot.

He cannot subscribe to the feasibility of the production of this deformity by amniotic bands and adhesions. Trauma, the essayist says, has been assigned as a possible cause in the production of malformations in the human fetus, and the clinical history of this shows that there had been several unsuccessful attempts to induce abortion.

Dissection by W. T. Eckley. Muscles on anterior region of limb: semitendinosus, semimembranosus. Muscles on posterior region of limb: sartorius, rectus femoris and vasti. Adductor group (medialis): adductor longus, gracilis and adductor magnus.

Nerves: great sciatic in front; obturator medially; anterior crural, behind.

Arteries: femoral (posteriorly) bears inverse relation to anterior crural nerve; obturator branch of internal iliac antero-mesially to adductors.

Anus and external genital organs absent. Alimentary canal normal as far as rectal portion, which latter ended in a freely movable dilatation one-half inch in diameter. Peritoneum normal. Permanent kidneys absent. Mesonephros—with its duct opening into aforesaid rectal pouch (cloaca?).

Mesonephros on right side only. No bladder present; urachus present and patent. Meckel's diverticulum 25 inches long, the size of a very small thread and patent—would admit very small bristle. Uterus bifid; ovaries, oviduct and round ligament normal for child at full term. Ductus arteriosus of large size.

Report of a Case of Syren Malformation. Stokes and McNeer. (*Maryland Medical Journal,* January, 1902.)

This monster was dissected by the authors with the following results: The legs were found fixed and there was no true pelvis, the pelvic bones forming a solid platform. The large intestines ended as a blind pouch in the region of the sigmoid. There was no trace of a rectum or of an anal opening. There was no bladder, properly speaking, but in

the region of the bladder there was a small rounded mass. There were no sexual organs of any kind. The ureters emptied into the blind pouch in the sigmoid region.

Teaching Anatomy of the Nervous System. L. Harrison Mettler. (*Medical Record,* Oct. 5, 1901.)

The writer says the fundamental vertebrate cerebro-spinal axis is a readaptation of the articulate organ, which latter reverts to the primitive neuromeres in the coelenterata. This latter consists of ganglionic rings surrounding the remains of the primitive orchenteron. Each primitive ring of gray matter is connected with rings above and below it, by associative tracts—the antero-lateral and postero-lateral root-zones, and has both afferent and efferent processes to muscle, skin and viscus of the corresponding metamere. The spinal cord of the anatomies includes developmentally and physiologically nothing more. The other columns of the cord, he says, belong to the encephalon, and posterior root-ganglia. The independence of the long sensory tracts he proves by a case (observed by Leonowa), in which there was absence of spinal cord, and presence of the posterior root-ganglia. In like manner, he proves the independence of the motor function of spinal neuromeres by the absence of the pyramidal tracts in encephalous monsters.

He regards the long sensory tracts as an inward and upward projection, alongside the primitive cord, of processes of cells, resident in the posterior root-ganglia. The various paths have a most intimate connection with the gray matter of the primitive cord, and, in turn, this gray matter probably coordinates and re-arranges inpouring sensations; while the pyramidal tracts he regards as neuraxons of cortical cells, which make up the extreme frontal ganglionic mass of the entire cerebro-spinal axis, and by means of whose terminal arborizations in and around the motor areas of the segmental ganglia of the cord the cortex *inhibits the movements of the body.*

The writer does not believe, with the older anatomists, that the spinal cord should be taught and described as an

organ (as are the heart and liver), whose functions are (a) conduction of impulses between brain and nerves; (b) elaboration of reflex, automatic and coordinating phenomena, and maintenance of tone and nutrition of muscles, but that, in view of the newer conception of the nervous system (by which both structure and function of the cord have been simplified), the primitive segmental character belongs to the entire cerebro-spinal axis, and that the cord, in the essential nature of its phenomena, differs but little from that part which ultimately becomes the encephalon, the accredited seat of conscious mentalization. The study of the nervous system is best conducted by tracing its evolution rather than by describing its complex adult condition.

On the Development of the Nuclei Pontis During the Second and Third Months of Embryonic Life. Margaret Long. (*Johns Hopkins Hosp. Bull.*, XII., 121-123, 1901.)

Most of the text is occupied in a description of the thirteen figures which accompany the article.

Summary: The main nucleus pontis is situated on the ventral surface of the rhombencephalon at the level of the pontal flexure.

The nuclei pontis first appear in the ventral part, and on the surface of the mantle layer of the lateral part of the pons. The ventral fiber bundle is ventral to all except a cell mass, "H."

Next the nucleus pontis ventralis extends across the middle line of the rhombencephalon, while the dorsal nuclei pontis are separated from its lateral part (of the ventral nucleus) by the ventral fiber bundle.

Next the dorsal nuclei form two solid masses, reaching almost to the middle line, which become continuous with the ventral nucleus at the extreme lateral end, being separated otherwise by the ventral fiber bundle. Next the nucleus pontis becomes a solid ventral shell, cut by a small branch from the ventral fiber bundle.

After 6 months, the pons consists mainly of fibers and scattered cell groups, which increase at the expense of the

dorsal part of the nucleus, leaving a narrow ventral mass or nucleus on the surface.

The neuroblasts of the pons are continuous with the epithelium of the floor of the fourth ventricle, (1) by a cell mass at the lateral end of the pontal nucleus, (2) by the round cells in the raphe, (3) and in the middle line by the neuroblast in the wedge which connects the ependymal epithelium and a cell mass with the nucleus pontis.

Cell mass "H" is a mass of deeply staining cells on the ventro-spinal surface of the mantle layer at the pontal flexure, at the level of the facial nerve, continuous, opposite the trigeminal nerve, with the nucleus pontis, and in other directions it extends to the ventricular epithelium of the medulla.

Cell mass "M" is a small dark cell mass, on either side of the floor of the fourth ventricle, just cerebral from the pontal flexure.

Normal Menstruation and Some of the Factors Modifying It. C. D. Mosher. (*Johns Hopkins Hosp. Bull.*, XII., 121-123, 1901.)

A rhythmical fall of blood pressure occurs in both men and women. In women, it occurs about the menstrual period. There is a preliminary sudden fall, followed by a gradual fall, extending over two or three days, followed by a gradual rise to the normal, which is preceded by a preliminary sudden rise. All persons are more susceptible to symptoms of various kinds during this fall of pressure, and many cases of dysmenorrhea are but the expression of this susceptibility.

Origin of the Lymphatics in the Liver. F. P. Mall. (*Johns Hopkins Hosp. Bull.*, XII., 121-123, 1901.)

Inject bile duct, portal vein and hepatic artery. Vascular walls of embryo and inflamed area are more pervious, so it is easy to inject the lymphatics. Use colored gelatin injections.

All bile is taken up by lymphatics after ligation of bile duct, and when thoracic duct is ligated also no bile, or only a trace, gets into the blood, because large amounts of

lymph pass from the capillaries to the lymphatics, as that is the course of the current. The walls of the liver capillaries are very pervious. There are no direct channels connecting the perivascular and perilobular lymph spaces with the lymphatics proper, other than the ordinary spaces between the connective tissue fibrils of the capsule of Glisson, but these spaces are large. The capillaries of the liver communicate more freely with the lymphatics than do the bile ducts.

The liver lymphatics arise from the perilobular lymph spaces, which communicate directly with the perivascular lymph spaces, and the lymph reaches these spaces by filtration through the pervious capillary wall.

Fluid entering the lymphatics from the bile duct leaves the bile duct as it enters the lobule, is at once taken up by the lymph radicles and perilobular lymph spaces, and from them may extend as a secondary injection to the perivascular lymph spaces, and often to the blood capillaries of the lobule.

The large lymphatics accompanying the veins rise between the lobules at their bases, and around the large sublobular veins.

The course of the lymph is through capillary wall to perivascular lymph spaces. These spaces communicate at the periphery of the lobule directly with a large lymph space between the liver cells and Glisson's capsule, the perilobular lymph space, and thence to the lymph radicles through the connective tissue spaces in the capsule of Glisson.

Notes on the Basement Membrane of the Kidney Tubules. F. P. Mall. (Ibid.)

The whole framework of the kidney, including the basement membranes, from the capsule to the pelvis, is formed by one mass of anastomosing fibrils, and the sharp borders of these fibrils mark the outlines of the tubules to form the basement membrane, which in ordinary sections appears to be homogeneous, so that the fibrils of the basement membrane are the same as those of the interstitial tissue.

The homogeneous appearance is due to the substances used (strong acids) in isolating the basement membrane. Macerate for some days in a cold sat. sol. of $NaHCO_3$; then shake with water, and examine on a slide. Basement membranes give reactions like membranes of elastic fibrils, but identity is not established.

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